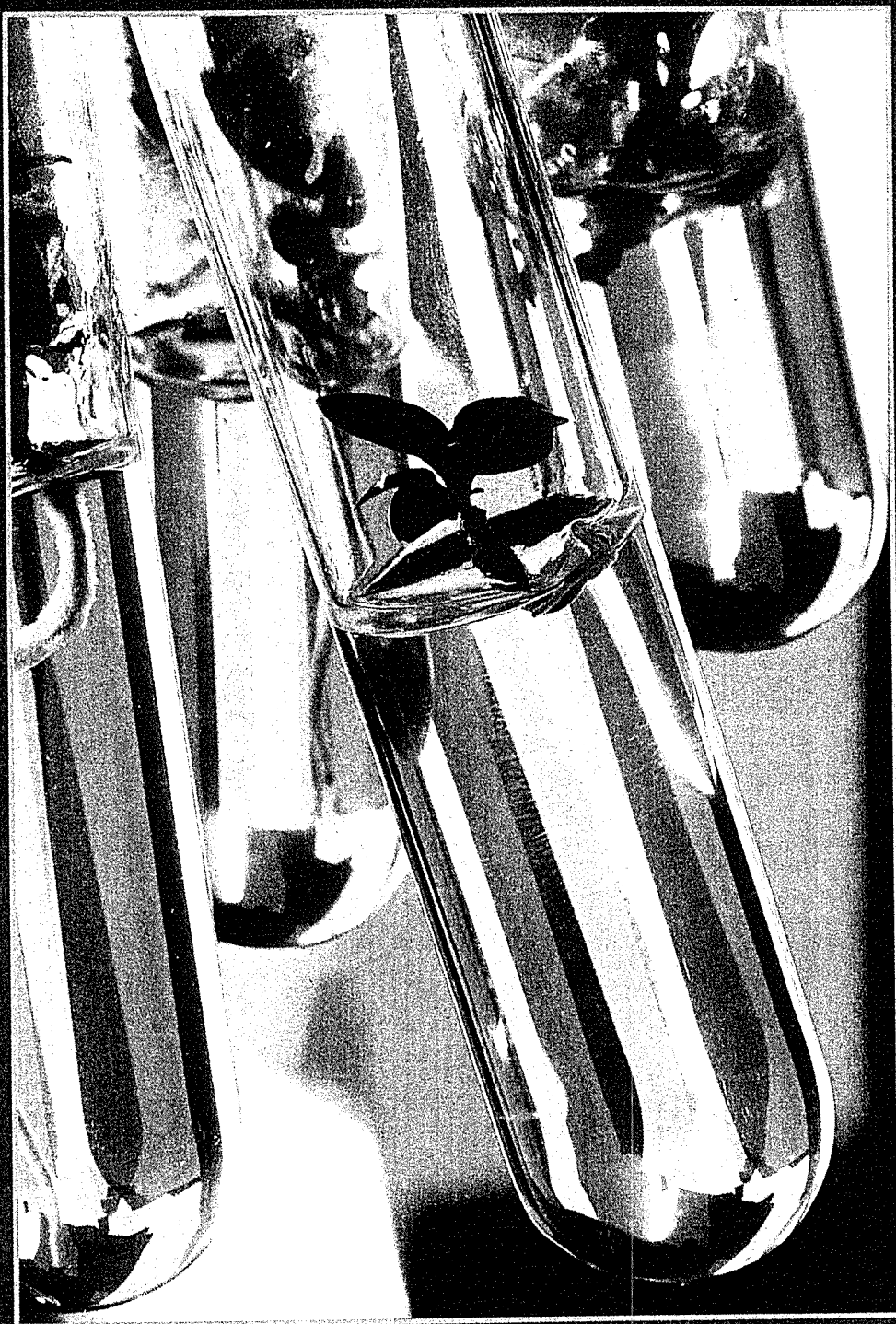


TEACHER RESOURCE BOOK

DYNAMIC SCIENCE

BOOK 1



D. WILSON • M. BAUER

Are you a good safety officer?



1. Draw a plan of your science laboratory.

On your plan, label doors, windows, the fire-extinguisher, the fire blanket, the sand bucket and the bin for broken glass.

Also mark the positions of:

- the taps for the gas mains;
- the taps for the water mains;
- the mains switch for electricity.

Remember. These taps and switches should only be used by the teacher.

2. What would you do if:

(a) an accident caused gas to catch alight from a gas tap?

(b) some methylated spirits caught fire on the bench?

(c) a student's long hair caught fire?

(d) you touched a hot tripod?

(e) liquid was spilt on the floor?

3. Is it safer to stand up or to sit down when doing experiments with chemicals? Explain your answer.

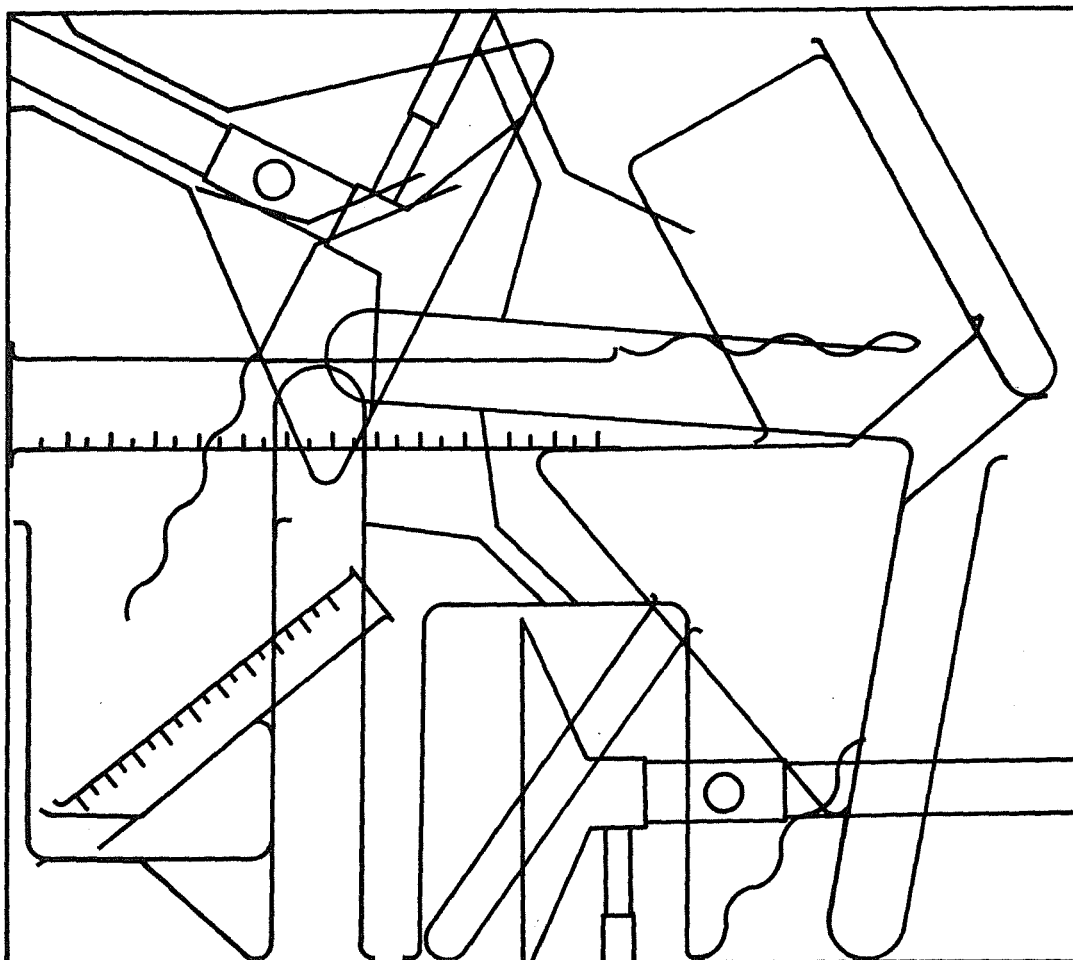
4. Why should broken glass be placed in a special bin?

Danger in the laboratory

1. Look at the pictures below and list all unsafe activities.
2. Spot at least *ten* differences between the two pictures.



Equipment jumble

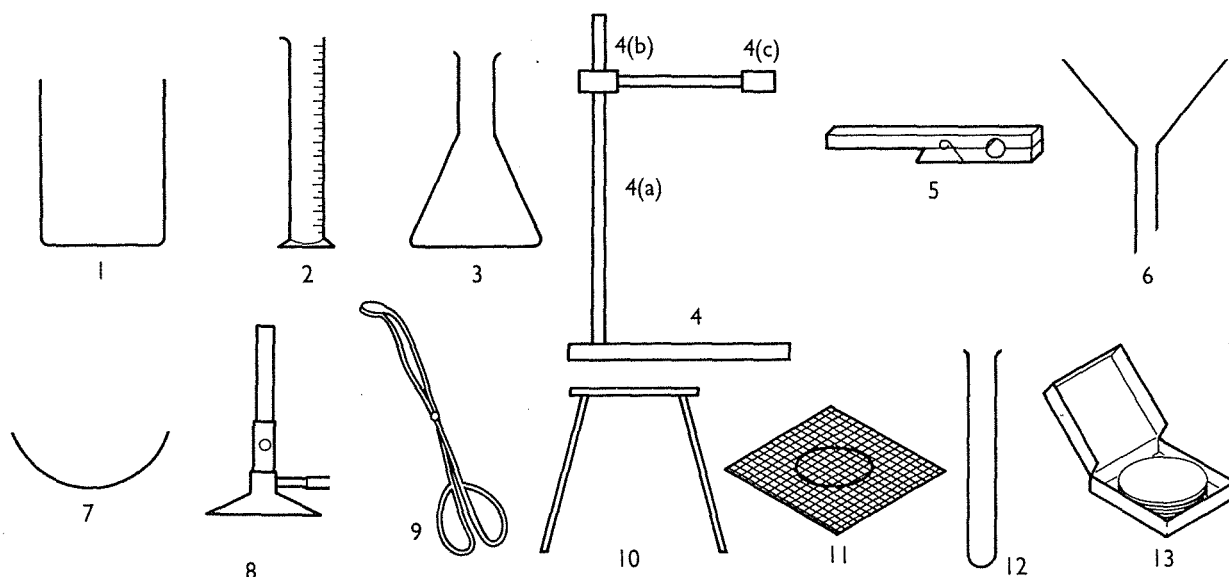


There are many pieces of science equipment in the diagram.

1. Name the pieces of equipment.

2. Beside the names of the pieces of equipment, write down how many of each type there are, e.g. **2** measuring cylinders.
3. In your notebook, draw and label each piece of equipment you can find in the diagram.

Equipment, equipment, equipment



A. Name the pieces of equipment:

- | | |
|------------|-----------|
| 1. _____ | 7. _____ |
| 2. _____ | 8. _____ |
| 3. _____ | 9. _____ |
| 4(a) _____ | 10. _____ |
| 4(b) _____ | 11. _____ |
| 4(c) _____ | 12. _____ |
| 5. _____ | 13. _____ |
| 6. _____ | |

B. Which pieces of the equipment would you use to:

1. evaporate a solution using a Bunsen burner?

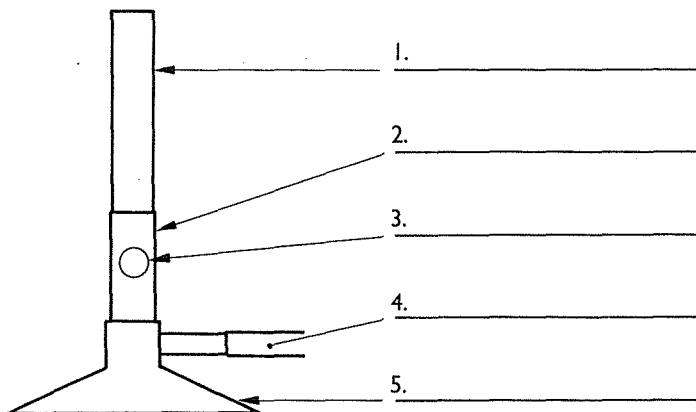
2. filter muddy water?

3. measure a volume of water?

C. In your notebook or on the back of this sheet, draw the experimental set-up for 1 and 2 in Question B.

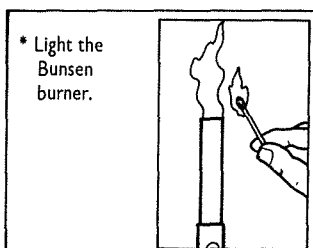
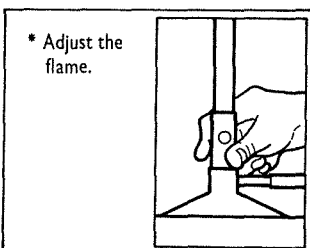
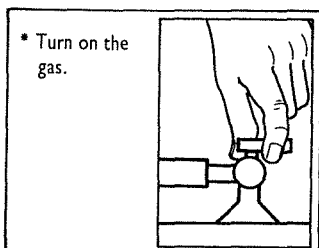
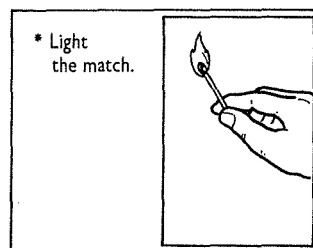
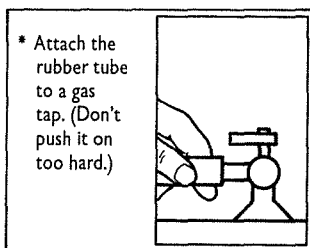
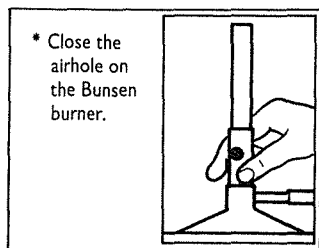
The Bunsen burner—a cut-and-paste sheet

1. Label the Bunsen burner.



2.

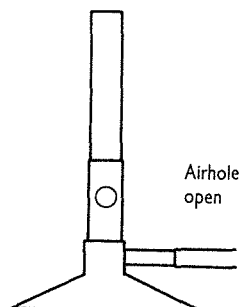
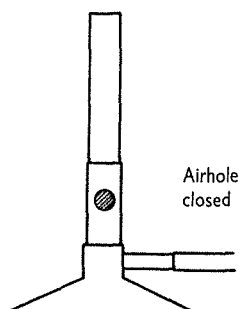
How to safely light a Bunsen burner



The instructions for lighting the Bunsen burner were mixed up. Cut them out and paste them into your book, in the *correct* order.

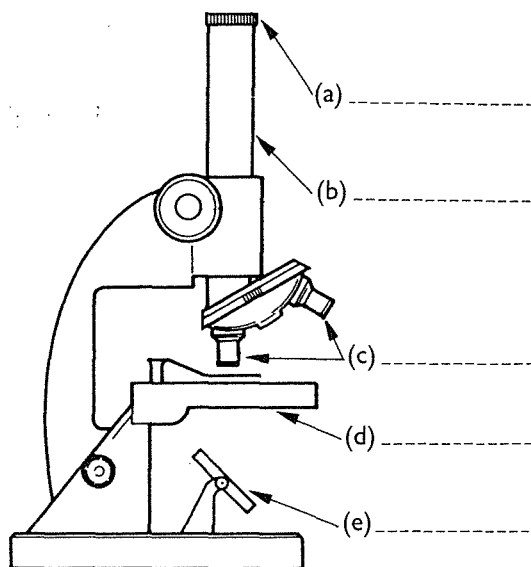
3. Draw and colour the flames on the Bunsen burners below.

Which flame is which?



The microscope

1. Label the the diagram of the microscope.



2. Complete the following sentences about the correct handling of microscopes:

- (a) Microscopes must always be used _____y.
- (b) Always carry a m_____ using _____h hands.
- (c) Always adjust the mirror so there is enough _____g_____ to see the specimen.
- (d) The specimen is placed onto a glass microscope _____d_____, which is then carefully placed under the clips on the _____g_____ of the microscope.
- (e) If the stage is too close to the objective lens, the glass slide may get _____n.
- (f) Always start with the objective lens with the l_____ power.

3. (a) Find all the missing words from Questions 1 and 2 in this puzzle. *Note:* Some words are spelt backwards.

(b) There is a message left after all the 'missing words' have been crossed out. What does the message say?

T	H	I	S	O	B	J	E	C	T	M	E	A	K
E	S	S	M	N	E	K	O	R	B	A	Y	L	L
Y	T	M	I	C	R	O	S	C	O	P	E	H	I
L	N	T	U	B	E	T	G	S	A	P	P	P	L
L	E	A	R	B	A	I	R	O	R	R	I	M	O
U	G	G	E	G	R	M	S	L	I	D	E	I	W
F	C	R	E	O	B	I	O	L	L	O	C	G	E
E	O	B	J	E	C	T	I	V	E	L	E	N	S
R	I	O	S	T	S	G	U	S	E	T	H	E	T
A	S	T	E	S	H	P	E	C	I	A	L	D	E
C	V	H	S	T	A	G	E	I	C	E	S	!	!

4. *Research.* Use library books to find out about the history of microscopes.

5. *Activity.* Can a droplet of water be used to make things look bigger? Experiment to find out.

A famous scientist of the twentieth century

- Calculate the answer to each of the following nine questions.
- The answer corresponds to a letter.
- Use the letter to identify the famous scientist.

1. If the percentage of nitrogen found in air is 80%, what fraction of the air is made up of nitrogen?
Code letter B
2. The heights of the healthy plants were as follows: 10 cm, 12 cm, 11 cm, 9 cm, 10 cm, 8 cm.
What was the average height of these plants?
Code Letter R
3. In Year 7, there were 200 students:
50 students had blue eyes.
100 students had hazel eyes.
50 students had brown eyes.
0 students had green eyes.
What fraction of the students had hazel eyes?
Code letter T
4. In a plant-growing experiment, 75% of the plants grew well. What fraction of the plants *did not* grow well?
Code letter E

The next three questions refer to the following information. The same 200 Year 7 students ate the following for lunch:

- 150 apples
- 100 bananas
- 150 bottles of fruit juice
- 75 bags of chips
- 25 pies

What fraction of the students:

5. ate apples?
Code letter I
6. ate pies?
Code letter N
7. ate bags of chips?
Code letter S
8. The students in Juan's practical group were the following heights: 154 cm, 159 cm, 154 cm, 157 cm. The average height is _____ cm.
Code letter A
9. The students in Celeste's group had the following weights: 55 kg, 48 kg, 52 kg, 53 kg. The average weight is _____ kg.
Code letter L

The famous twentieth century scientist's name

156	52	4/5	1/4	10	1/2
-----	----	-----	-----	----	-----

1/4	3/4	1/8	3/8	1/2	1/4	3/4	1/8
-----	-----	-----	-----	-----	-----	-----	-----

Extension work

Who is the famous person? What work did this person do?

‘Beginning science’ review

- Fill in the missing words to complete the following sentences.
- Find the ‘missing’ words in the maze. The words may be vertical, horizontal or diagonal.
- There are many more words in the maze including the names of at least eight pieces of equipment. Find and list them on the back of this sheet.

T____e care in the science laboratory. It is often best to leave school b_____ outside the room, so students do not trip over them.

Before doing experiments, w_____ up the practical report using the correct headings. The headings are the a____, h_____, equipment or a_p_____, m_____ observations and sometimes results. Once the experiment is done, the results can be completed. Using the results, it is sometimes possible to make a c____c_____. Include a d_____m of the equipment used too. Sometimes experiments do not work out as planned. A d____c____s_____n is then included in the report.

Always use common s_____n_____e and ask the teacher for h_____p if you need it. S_____ quietly and listen carefully to all instructions.

Some important laboratory rules include:

1. When using a B_____ b_____, u_____ elastic bands to tie back long h____r.
2. Always c____e____r the area on the bench before starting a practical activity.
3. Do not e_____ in the laboratory because poisoning may occur.
4. Mop up any spills on the floor so people do not s____p over.
5. Make sure all gas and water t____p_____ are turned off properly.
6. If you crack or b_____k glassware it is vit____l that you tell the teacher so it can be replaced.
7. At the end of practical lessons, when g____s____w_____ has been used, make sure the glass is washed with s____p and w_____, and put away.
8. When you are dismissed, waste _____ time. Do not l_____ger in the laboratory.

I	S	S	T	M	E	T	H	O	D	C	S	B	G	A	U	Z	E
M	A	T	R	R	T	F	T	E	S	T	T	U	B	E	S	I	T
R	F	P	I	P	A	L	I	K	E	I	O	N	E	T	E	M	I
U	E	F	P	M	P	E	C	L	A	C	P	S	H	H	A	I	R
N	T	I	O	A	S	A	L	E	T	E	O	E	R	E	T	A	W
M	Y	V	D	L	R	N	R	C	N	E	R	N	S	L	I	P	N
A	W	E	I	C	B	A	G	E	P	E	R	B	I	P	G	K	O
R	A	E	T	T	C	C	T	E	A	S	L	U	S	C	L	S	I
G	T	T	A	E	A	S	O	U	O	N	E	R	E	R	A	A	S
A	C	S	K	T	I	L	N	S	S	E	N	N	H	U	S	L	S
I	H	A	E	L	I	N	G	E	R	S	N	E	T	C	S	F	U
D	T	T	D	A	E	H	S	S	O	B	U	R	O	I	W	D	C
C	O	N	C	L	U	S	I	O	N	S	F	S	P	B	A	O	S
O	R	E	T	O	R	T	S	T	A	N	D	S	Y	L	R	O	I
O	N	N	O	I	T	A	V	R	E	S	B	O	H	E	E	F	D



Planetary fun puzzle: Who was the first person in space?

Solve the puzzle to answer the question.

- Draw a straight line from the question to the closer correct dot.
- The line will pass through a letter. The letter will help you to crack the code.

1. The planet with the same length day as Earth

2. The planet with no atmosphere

3. The planet with a diameter greater than 140 000 km

4. The planet with an atmosphere of nitrogen and oxygen

5. The planet with the most spectacular rings

6. The planet whose atmosphere is made only of methane

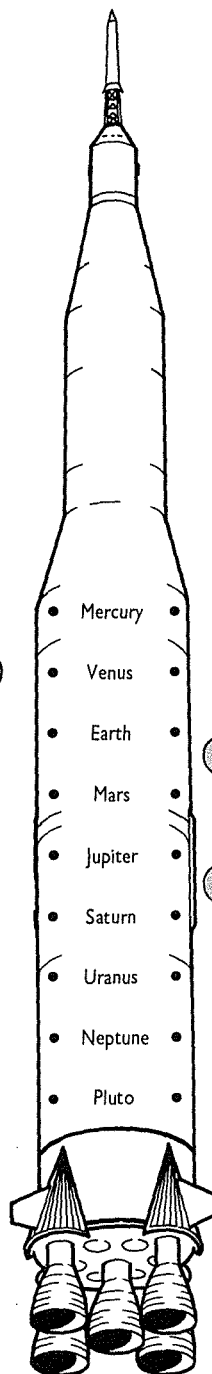
7. The planet whose day is longer than its year

8. The planet with a big red spot

9. The planet with a day 16 hours long

10. The planet with no moons

11. The planet with the most moons



1	2	3	4
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5	6	7	8	9	10	11
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Research

Find out more about this famous astronaut.

The famous 1969 lunar mission

- Read the information about items taken on the 1969 lunar mission.
- Answer the questions which follow.

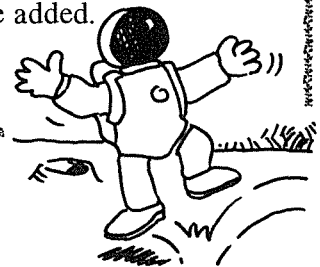
THINGS TAKEN INCLUDED:

Clothing

- Spacesuit and helmet: Earth weight 82 kg
- Underwear: Water moved through the plastic underwear to keep the body cool.
- Inflated suit: Suit was made of layers of teflon and nylon, which were covered with fire-retardant fabric.
- Space helmet: Helmet had two layers to protect the astronaut from radiation.
- Insulated gloves.
- Backpack: The backpack contained gases. The gases were needed for breathing and to keep the spacesuit pressurised.

Food

- Freeze-dried sandwiches and meals in sealed bags, ready for water to be added.
- Some foods were in tubes which looked like toothpaste tubes.
- Drinks were squirted into the mouth using a water-pistol-type device.



1. Why do you think each astronaut had:

(a) water-cooled underwear?

(b) a fire-retardant suit?

(c) a space helmet with two layers?

(d) food and drink packaged in special ways?

2. Comment on the weight of each astronaut's suit.

(Note: The gravity on the Moon means that the astronauts weigh only one-sixth of Earth weight when they are on the Moon.)

3. On the back of this sheet, write a story called 'My trip to the Moon'.

Crossword: Famous astronomers

Use Chapter 2 of the textbook to help with this puzzle.

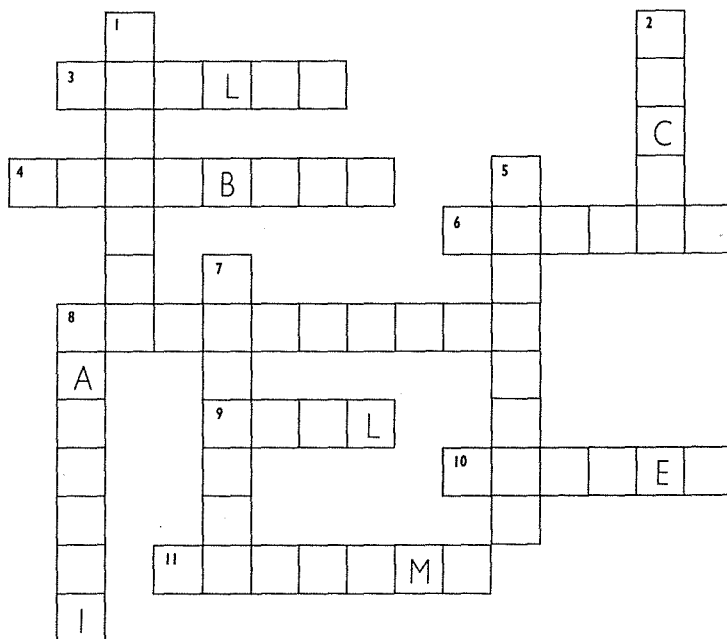
Clues

Across

3. A famous comet was named after him.
4. The Governor who set up an observatory at Parramatta.
6. Famous scientist who used ideas about gravity.
8. Polish monk who changed the basic ideas about astronomy.
9. English woman who discovered pulsars.
10. This man said the orbits followed by planets were elliptical in shape.
11. 2000 years ago, this Greek astronomer said the Earth was at the centre of the universe.

Down

1. The astronomer who discovered four moons orbiting Jupiter.
2. Danish astronomer's (1546–1601) first name.
5. Give the surname for the famous brother and sister astronomers. Caroline discovered many comets and William discovered Uranus.
7. Australian astronomer who appears on the one hundred dollar note.
8. Astronomer who first described the structure of Saturn's rings.



Extension

Make up your own crossword or word maze using some or all of the following words: astronomy, constellation, meteorite, ellipse, orbit, telescope, rotation, revolution, solar, crater, day, moon, year, satellite, axis, meteor, galaxy, comet, revolve.

By Jupiter! What a lot of moons!

Some moons of Jupiter, together with their diameters, are listed in the following table:

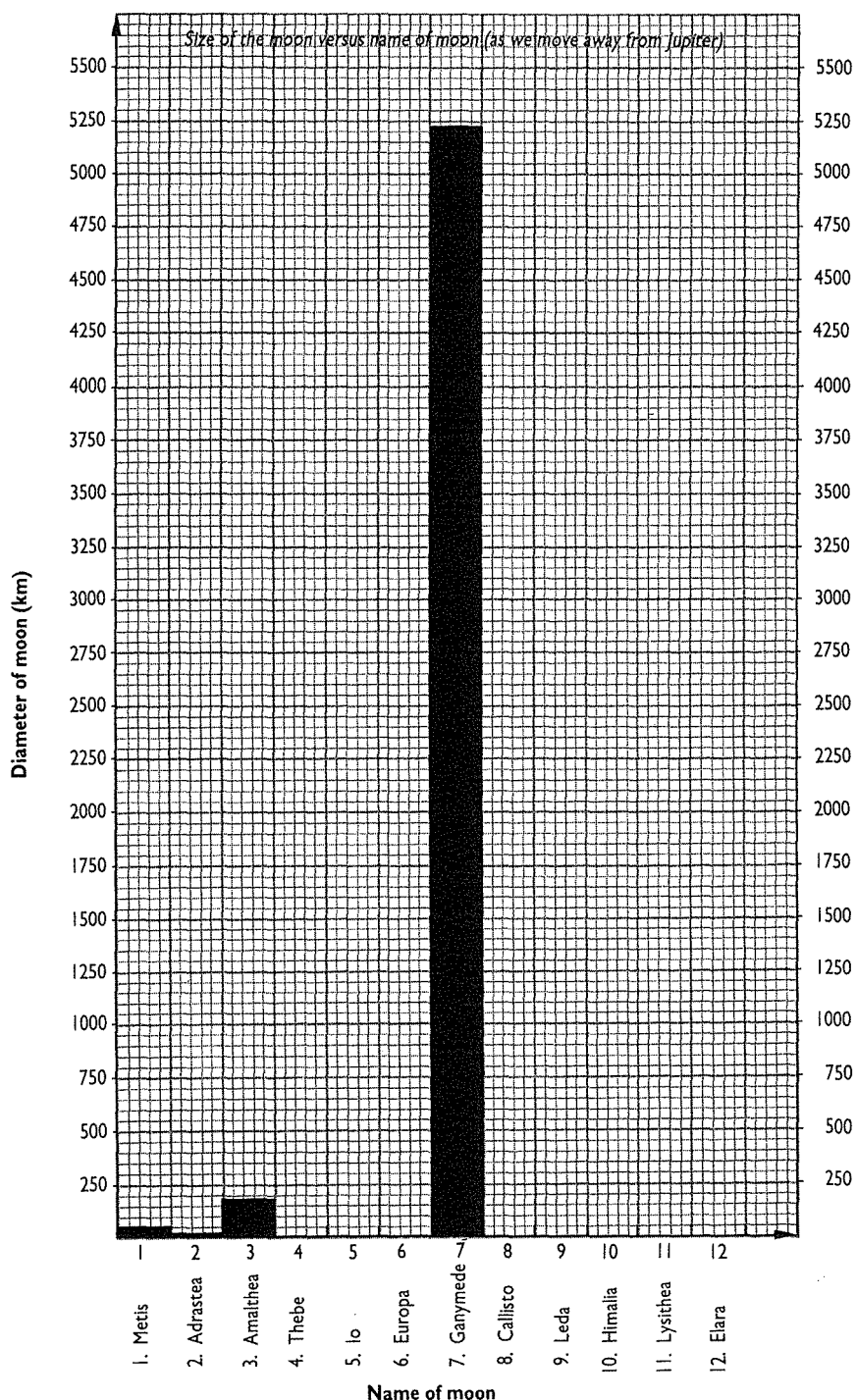
<i>Moon of Jupiter</i>	<i>Approx. diameter (km)</i>
Metis	40
Adrastea	24
Amalthea	170
Thebe	80
Io	3610
Europa	3120
Ganymede	5230
Callisto	4770
Leda	14
Himalia	184
Lysithea	35
Elara	75

- Plot the diameters on the bar graph. Four have already been done to make your task easier.
- Galileo saw four of these moons through a primitive telescope, hundreds of years ago.

(a) Which moons do you think Galileo would have seen?

(b) Why do you think he saw only four moons?

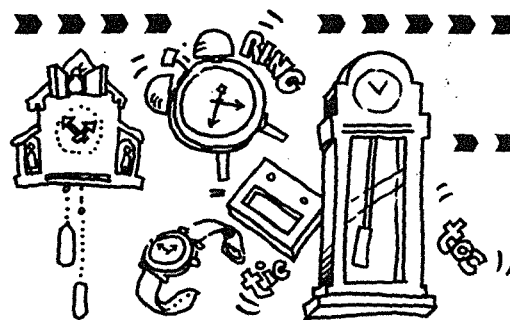
- Use information from the textbook to write a sentence in your notebook about each of the Galilean moons.



Research

What is the difference between a *refracting* and a *reflecting* telescope? Find out which type of telescope Galileo used. Draw a simple diagram of the internal structure of a telescope like the one Galileo used.

Time in the solar system



1. State what an astronomer means by the words:

(a) 'day';

(b) 'year'.

The following table shows information about the length of the day and year for the planets in our solar system.

Planet	Length of day (hours or Earth days)	Length of year (years or Earth days)
Mercury	59 days	88 days
Venus	243 days	225 days
Earth	24 hours	1 year
Mars	24.5 hours	1.9 years
Jupiter	10 hours	11.9 years
Saturn	10 hours	29.5 years
Uranus	24 hours	84 years
Neptune	16 hours	165 years
Pluto	6.5 days	249 years

Use the table to answer the following questions:

2. Name the planet which has the longest:

(a) day: _____

(b) year: _____

3. Name the planet/planets which has/have the shortest:

(a) day: _____

(b) year: _____

**Let us imagine that we could exist on other planets.
How would different lengths of day and night affect us?**

Example

A Jupiterian says he sleeps half the Jupiterian day, and the Earthling says she sleeps for only one-third of the day on Earth. Who sleeps longer?

1 day on Jupiter = 10 hours, so $\frac{1}{2}$ day = 5 Earth hours.

1 day on Earth = 24 hours, so $\frac{1}{3}$ of the day = 8 Earth hours.

We can see the Earthling sleeps longer than the Jupiterian.

Questions 4 to 7 are for you to do.

4. Who sleeps longer: a Neptunian who sleeps for half her day or a Uranian who sleeps for half of his day?

1 day on Neptune = ____ Earth hours, so $\frac{1}{2}$ day on Neptune = ____ hours

1 day on Uranus = ____ Earth hours, so $\frac{1}{2}$ day on Uranus = ____ hours

The _____ sleeps longer.

5. Who is older: a 10-Martian-year-old person or a 10-Earth-year-old person?

1 year on Mars = ____ Earth years

10 years on Mars = ____ Earth years.

The _____ is older.

6. Who attended school longer: a person on Earth who attended for 10 years, or a person on Mercury who attended school for 10 Mercury years?

1 year on Mercury = ____ Earth days,

so 10 years on Mercury = ____ Earth days

= approximately ____ Earth years.


The person on _____ attended school longer.

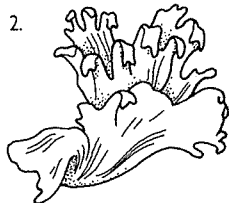
Plant family: What is the tallest standing hardwood tree in the world?


Hint: It grows in Tasmania and it is over ninety metres tall.

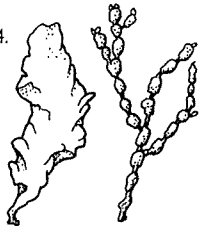
To solve the puzzle:


- Join the dot beside the plant picture to the closer dot beside the correct family name.
(Note: All the family dots may not be used.)
- Each line will pass through a letter that will help you to crack the code.

1.  moss

2.  staghorn

3.  wheat

4.  seaweed

5.  Norfolk Pine

(A)

(M)

(E)

(R)

(T)

(U)

(U)

(T)

(G)


← Algae →


← Mosses and liverworts →

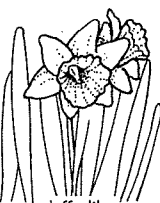
← Ferns →


← Conifers →


← Flowering plants →


6.  apple tree

7.  hoop pine

8.  daffodils

9.  bracken fern

10.  club moss

11.  bottlebrush

(T)

(O)

(F)

(L)

(I)

(S)

(A)

(A)

(E)

(R)

(H)

(S)

(P)

1	2	3	4	5	6	7	8
---	---	---	---	---	---	---	---

9	10	11
---	----	----

Research

Use encyclopaedias and books such as the *Guinness Book of Records* to find out about other big plants.

Growth of plants

Glenda and Raji each grew a plant for their science activity. They measured the height of their plants each day. Here are their results:

Glenda's plant

Day	0	1	2	3	4	5	6	7	8	9	10
Height (cm)	2	3	4	6	8	10	10	11	11	11	11

Raji's plant

Day	0	1	2	3	4	5	6	7	8	9	10
Height (cm)	1	2	4	7	9	11	12	13	13	13	13



1. Use different colours for Glenda's and Raji's plants and plot their results on the set of axes provided.

2. Join each person's results with a line, so that there are two smooth lines—one for Glenda's plant and one for Raji's plant.

3. When were Glenda's and Raji's plants the same size?

4. (a) When did the plants stop increasing in size?

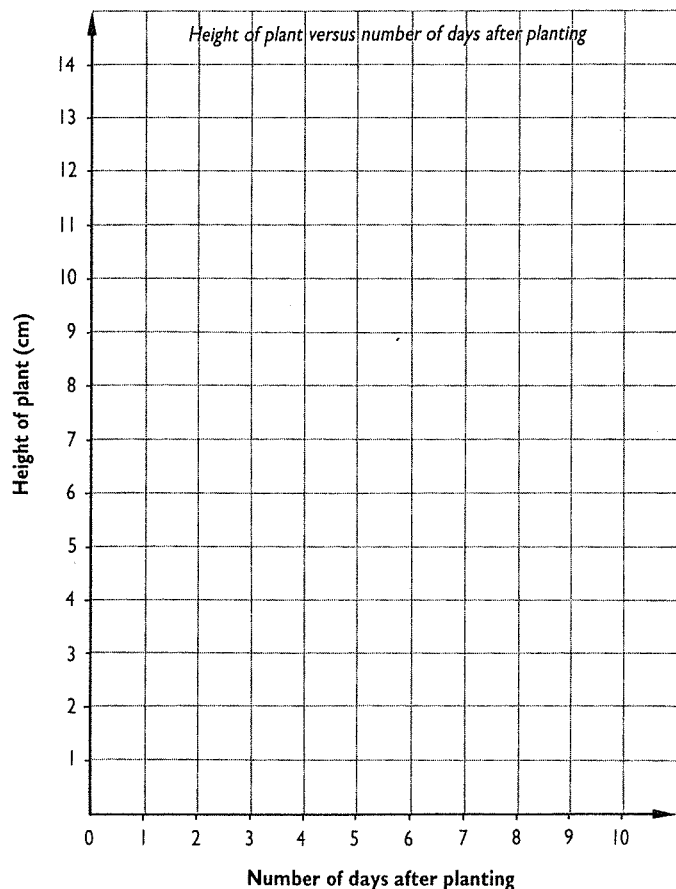
(b) When they stopped growing, what was the height of:

(i) Raji's plant? _____

(ii) Glenda's plant? _____

5. One plant had fertiliser added to it after day 2. Which plant was it? Explain your answer.

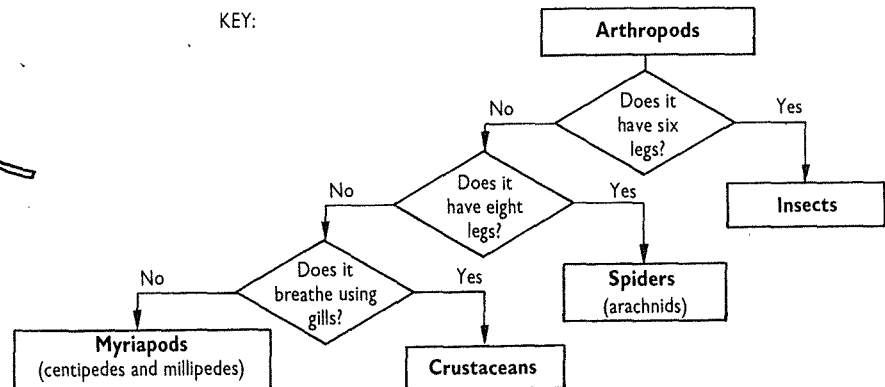
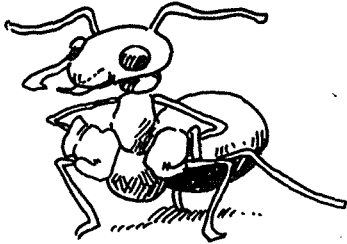
6. What would you expect to happen if the plants had been placed in the dark? Explain your answer.



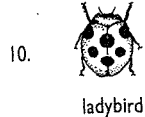
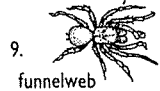
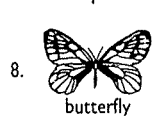
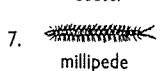
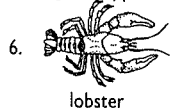
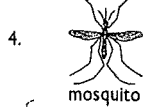
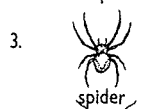
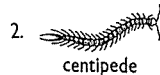
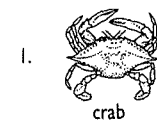
Activity

Get some wheat, cress or bean seeds and repeat Glenda and Raji's experiment. You might like to have several sets of seeds and grow them using different conditions (e.g. in the dark, with and without water).

Invertebrates: What is the most dangerous ant in the world?



- Use the key to place each invertebrate into its correct family.
- Using a straight line, join the dot from the invertebrate to its correct family name.
- Each straight line will pass through a letter. Use this letter to solve the puzzle.



- myriapod

- insect

- crustacean

- arachnid

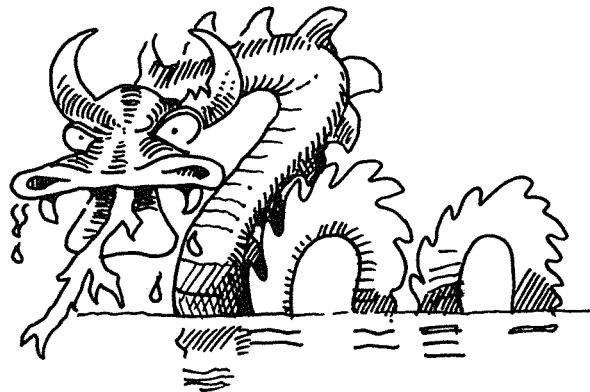
1	2	3	4	5	6	7
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8	9	10
---	---	----

Research

Use library books to find out more about this dangerous ant.

Who am I? The Aztecs called me 'water monster'.



Name the following to solve the puzzle:

1. The type of animal covered in fur, which feeds its young with milk. — — — — —
Use the second letter.
2. Tubes carrying water from the roots in plants. (See Ch. 5 in the textbook.) — — — — —
Use the first letter.
3. Invertebrates which usually have a shell and a muscular foot. — — — — —
Use the second letter.
4. The type of vertebrate which has dry, scaly skin. — — — — —
Use the second last letter.
5. The type of aquatic, immobile invertebrate with a porous body. — — — — —
Use the third letter.
6. The scientific name for the largest invertebrate family. — — — — —
Use the third letter.
7. The common name for a type of soft-bodied invertebrate with tentacles, often found washed up on beaches. — — — — —
Use the fourth letter.

The name of the animal is the

1	2	3	4	5	6	7
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Research

Use library books to find the common name for this amazing creature. Write a brief report about the animal, including where it lives and any other interesting facts about it.

Crossword: Living things

Clues

Across

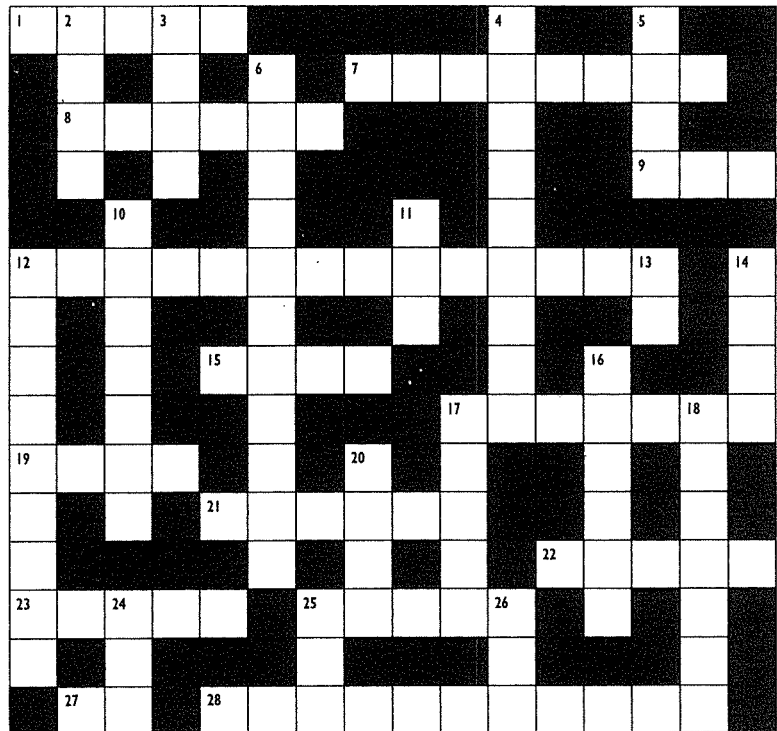
1. Traditional Aboriginal people use footprints to _____ animals.
7. Features used to group things are called _____.
8. Ducklings usually _____ their mother.
9. A desert is a _____ place.
12. System of putting things into groups, using similar features: _____.
15. Animals called fruit _____ hang from trees on summer's nights.
17. All living things _____ to their environment.
19. Coconuts grow on this type of tree: _____.
21. A word meaning able to move: _____.
22. All living things are made of small units called _____.
23. Molluscs usually have a _____.
25. Dogs will often run after or _____ cats.
27. Either _____.
28. Animals with backbones: _____.

Down

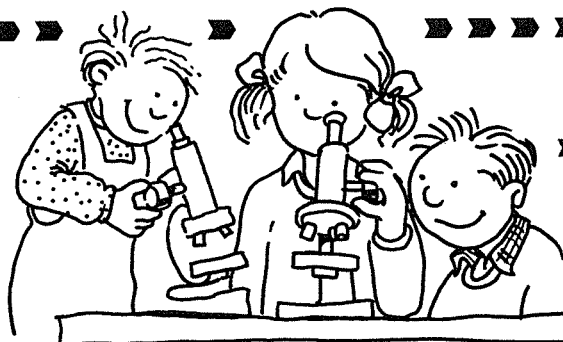
2. Logs tied together can make a _____.
3. The sound made by a bird is sometimes called a bird _____.
4. Cell walls help to give the plant _____ and support.
5. A vertebrate with feathers is called a _____.
6. Pollen is transferred from flower to flower by this process: _____.
10. Part of the cell used for storage: _____.
11. Waters near Antarctica have a lot of _____.
12. Material between the cell membrane and the nucleus: _____.
13. An animal cell has _____ cell wall.
14. Terrestrial animals live on the _____.
16. Mosses reproduce using _____.
17. Common name for tall plants that sometimes grow in lakes: _____.
18. 'Brain' of the cell: _____.
20. The group of vertebrates which live in water: _____.
24. Hearing organ: _____.
25. The first three letters of an orange coloured vegetable: _____.
26. To make a mistake: _____.

Extension

Make up your own crossword or word maze using some or all of the following words: respond, criteria, structure, classification, environment, immobile, pollination, algae, spore, liverwort, poikilotherm, vertebrates, invertebrates, amphibians, coelenterates, homoiotherm, echinoderms, nucleus, cytoplasm, chloroplasts, vacuole, habitat, ecology, behaviour, instinctive.

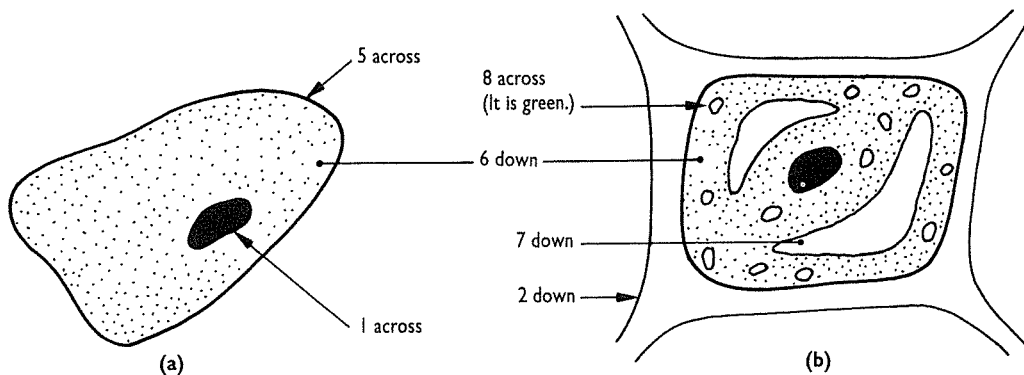


Crossword: What's what in a cell?



Using the diagrams and the clues provided, complete the crossword below.

Clues



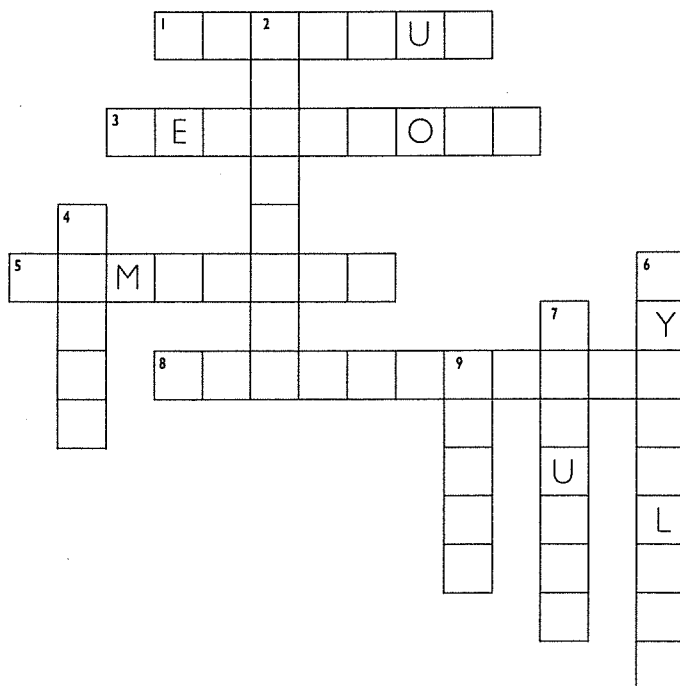
Across

3. 2 down contains this material.

Down

4. The diagrams show two different — — — — —.

9. Diagram (b) is a — — — — — cell.



Diagrams

Draw and label diagrams of a plant and an animal cell in your workbook.

Animal hunt

Look closely at the drawing. Find as many animals as you can. Copy the table into your notebook, leaving at least twelve spaces for different animals. One example is done for you. You may number the animals if you do not know the name of the particular animal.



Animal	Family	Interesting features
Koala	mammal	Climbs trees; eats special types of eucalyptus leaves; female has upside-down pouch.

Writing

On the back of this sheet or in your notebook, write a story called: 'I am a ' (animal living in the forest). If you can, include information about your food and other animals living in the forest with you.

Comprehension: Salvinia and the weevil

Salvinia is a water fern. One cubic centimetre of salvinia can grow into a metre thick mat covering a one hundred square kilometre area in less than one hundred days.

The fast growth affects other living things. The water surface is covered so quickly that *aquatic* life below the weed dies. The water cannot flow as fast as it could before the weed grew, so more mosquitoes can breed.

Trying to control salvinia has been difficult. *Herbicides* are expensive and the salvinia grows back quickly. Early in the 1980s, two Australian scientists working in Brazil found a *weevil* that ate only salvinia.

These weevils lay their eggs in the buds of the salvinia. When the *larvae* hatch, they eat the plant and kill it. Once the weed has gone, the weevil has nowhere to lay its eggs, so the weevils die too.

Since this important discovery, the weevil has been used to clear many waterways around the world.

Read the above passage and answer the following questions, in full sentences, in your notebook.

1. Use a dictionary to find the meanings of:

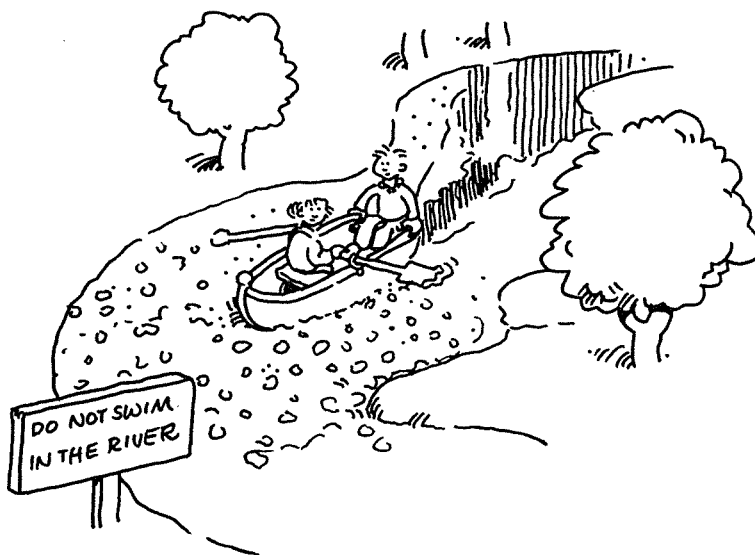
- (a) aquatic
- (b) herbicides
- (c) weevil
- (d) larvae

2. What is salvinia?

3. What does salvinia do to the water?

4. Are herbicides useful for destroying salvinia? Explain your answer.

5. How is salvinia controlled now?



Research: Cane toads

1. Why were these toads brought to Australia?
2. Comment on the problems now caused by cane toads.

Extension

Use as many words as possible from the comprehension passage to make a crossword puzzle or a word maze.

Crossword: Energy words

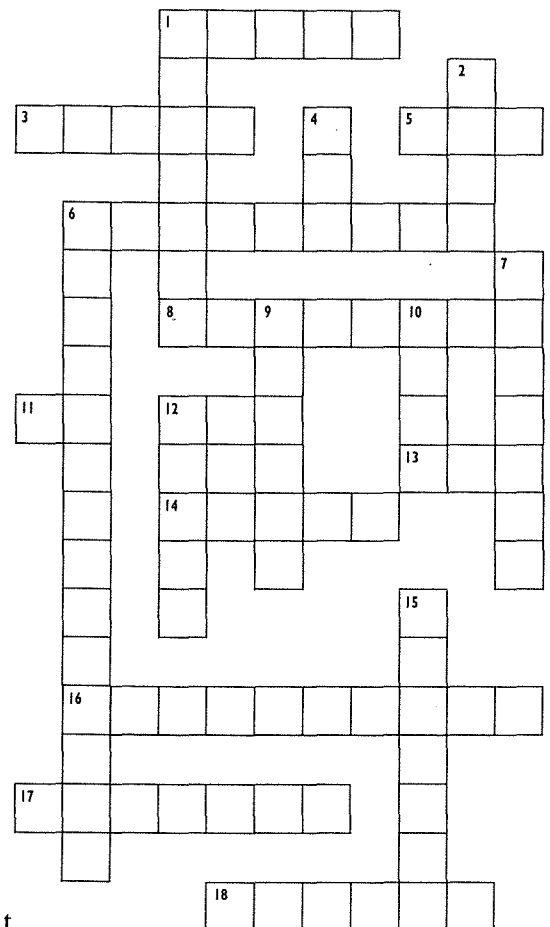
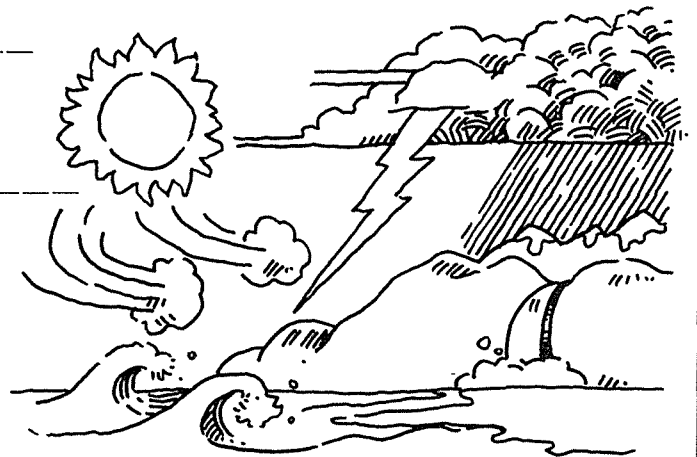
Clues

Across

1. These can be flown on windy days: _____
3. The form of energy we detect with our ears: _____
5. The original source of energy for the Earth: _____
6. Stored energy: _____
8. Burning magnesium releases its stored _____ energy.
11. _____ energy is ever destroyed.
12. We cannot _____ sound energy.
13. When a match is _____, we see light and hear sound.
14. One form of energy from the Sun: _____
16. Power stations change kinetic energy into this form of energy: _____
17. One type of nuclear reaction: _____
18. To _____ our fossil fuels do not run out, we must use them wisely.

Down

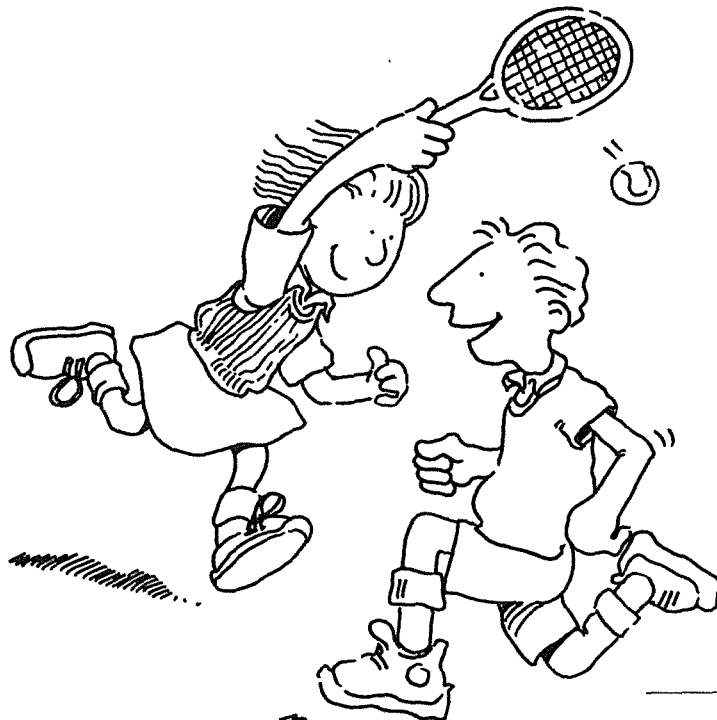
1. Energy of movement: _____
2. Oil is an example of a _____.
4. We _____ food to supply us with energy.
6. The plant process that uses solar energy to produce chemical energy: _____
7. A stretchy spring has this type of energy: _____
9. This cannot be created or destroyed: _____
10. A solid black fuel that comes from the Earth: _____
12. Energy from the Sun: _____
15. _____ reactions in the Sun give light and heat.



Extension

Make up your own crossword or word maze using some or all of the following words: energy, kinetic, convection, potential, chemical, gravitational, elastic, radiant, heat, light, electricity, static, radiation, conduction, law, solar, nuclear, conservation.

Energetically speaking



Tricia the tennis player and Jim the jogger both had a mass of 70 kg. They each ate the same food. However, they exercised differently. Use the energy chart and their exercise programs to work out how much energy Tricia and Jim used up.

Activity	Approximate energy use (kJ/min)
Walking	25
Jogging	60
Swimming	35
Surfing	35
Dancing	30
Tennis	30
Cycling	50

Tricia's exercise

Tennis for 30 min = kJ
 Surfing for 30 min = kJ
 Walking for 50 min = kJ
 Total energy use = kJ

Jim's exercise

Jogging for 30 min = kJ
 Dancing for 30 min = kJ
 Swimming for 40 min = kJ
 Total energy use = kJ

Which person used more energy: Jim or Tricia?

Use the same table to calculate how much energy you use up on:

1. a typical school day;
2. a typical Sunday.

Research

Use a diet chart to calculate how many kilojoules of energy are contained in your diet on:

1. a typical school day;
2. a typical Sunday.



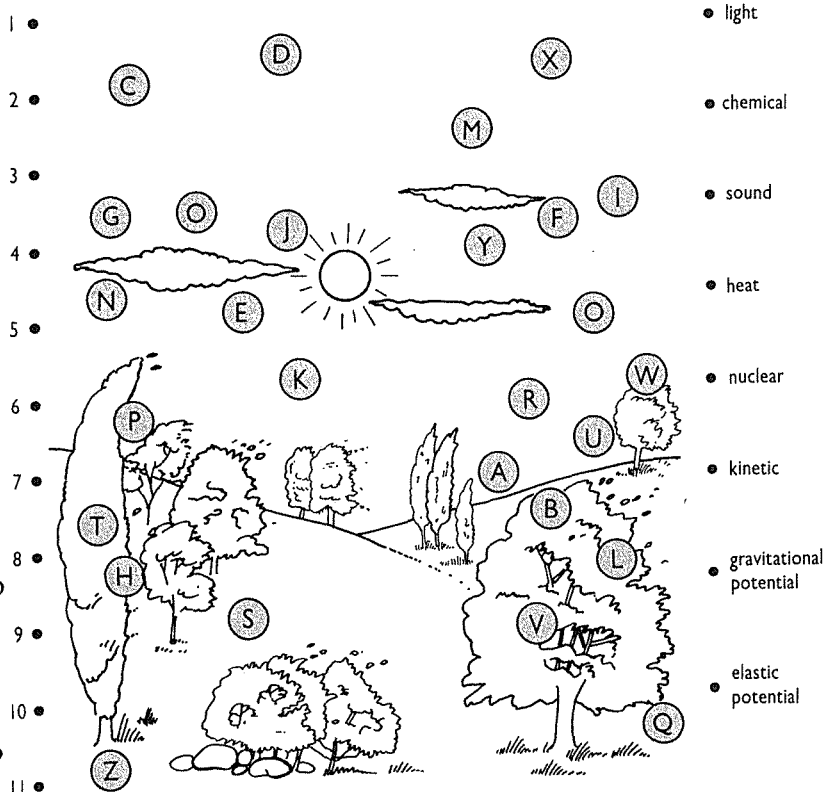
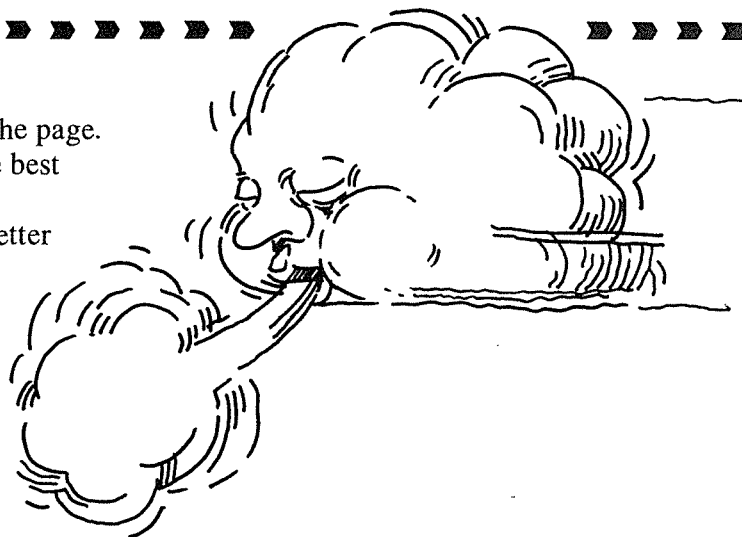
Energy puzzle: Where is the windiest place on Earth?

(Gales reach 320 km/h here!)

- Answer the questions on the left side of the page.
- Draw a straight line (using a ruler) to the best answer or answers on the left side.
- The line will pass through a letter. This letter will help you to crack the code.

What type of energy is:

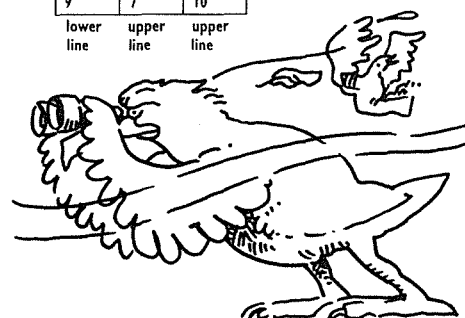
1. movement?
2. the energy a mountaineer has when she stands at the top of a mountain?
3. contained in food?
4. possessed by the springs in a trampoline?
5. released when nuclei of atoms join?
6. contained in petrol?
7. possessed by a falling leaf (two types!)?
8. music?
9. possessed by wind whistling (two types!)?
10. radiant energy (two types!)?
11. possessed by magnesium ribbon?



1	2	3	3	2	4	5	6	7	7	8	9
								upper line	lower line	upper line	

7	4	8	7	10	1	8	11	1	7
upper line			upper line	lower line					upper line

9	7	10
lower line	upper line	upper line



Research

Use an atlas to locate this place.

Energy 'find-it'

Name the different types of energy represented in the picture below.



Make a 'find-a-word' using as many energy words as possible. Get a friend to do your puzzle.

Where was the world's first major tidal power station built?

- Find the answer to this question by choosing the one that does not fit in each of the groups below.
- Circle the letter appearing in front of the 'odd man out'.
- Use the circled letters to answer the question.

You may need to use the index in the textbook to help with some of the answers.

- | | | | |
|--------------------------------|-----------------------|----------------------|-------------------------|
| 1. F anemometer | R barometer | L thermometer | B temperature |
| 2. B temperature | C pressure | R hygrometer | L windspeed |
| 3. A cyclone | I tsunami | M lightning | A aurora |
| 4. T ocean trough | W core | L mantle | P crust |
| 5. U metamorphic | N igneous | T mineral | O sedimentary |
| 6. A atmosphere | B mountains | R plains | S valleys |
| 7. B Beaufort | N Curie | E Richter | L Howard |
| 8. N stratosphere | W ionosphere | Y hemisphere | K exosphere |
| 9. V mudstone | F basalt | R sandstone | T conglomerate |
| 10. H gold | C diamond | U opal | R steel |
| 11. I nitrogen | A sulfur | E oxygen | O carbon dioxide |
| 12. M continental shelf | O ocean trough | L continent | N stratosphere |
| 13. A cirrus | C alveolus | D cumulus | V nimbus |
| 14. E iceberg | L hail | T fog | R rain |

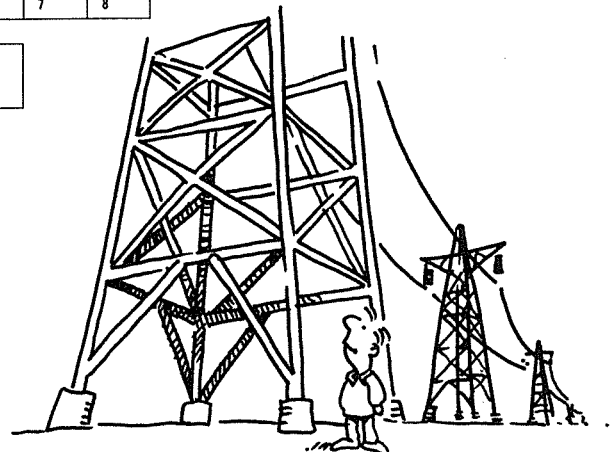
The power station is at

1	2	3	4	5	6	7	8
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in

9	10	11	12	13	14
---	----	----	----	----	----

Do you think using tides to produce electricity is a good idea? Explain your answer.



A famous Australian explorer and scientist

- Fill in the missing words.
- Read the letters down the page to find the name of this famous person.



1. Flat areas of land:
2. Rocks which are often found as layers:
3. Basic units of rocks:
4. Rain falls from these:
5. Type of igneous rock formed underground:
6. Name given to fluffy white clouds:
7. Air is a mixture of these:
8. Rock layer immediately below the Earth's crust:
9. Igneous rocks may come from these:
10. The outermost solid layer of the Earth:
11. Rocks changed by heat and pressure are called:
12. Device used to measure air pressure:
13. The season when there is the most ice at Antarctica:
14. Important substance dissolved in sea water:
15. The main gas in air:
16. Type of landform:

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

1	2	3
---	---	---

4	5	6	7	8	9	10
---	---	---	---	---	---	----

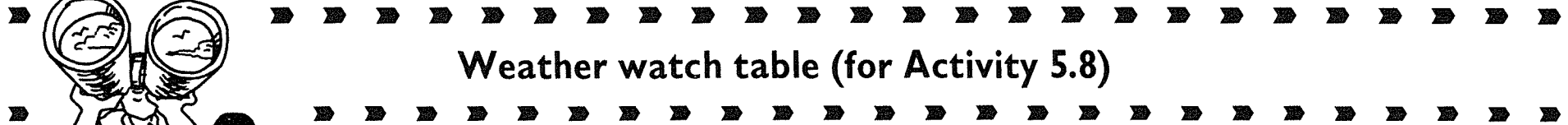
11	12	13	14	15	16
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Research

Find out more about this famous person.

Extension

Make up your own crossword or word maze using some or all of the following words: landform, plain, volcano, volcanoes, mantle, erosion, minerals, crystals, igneous, metamorphic, sedimentary, atmosphere, stratosphere, mesosphere, thermosphere, exosphere, ionosphere, gauge, anemometer, barometer, current.



Weather watch table (for Activity 5.8)

[illegible]

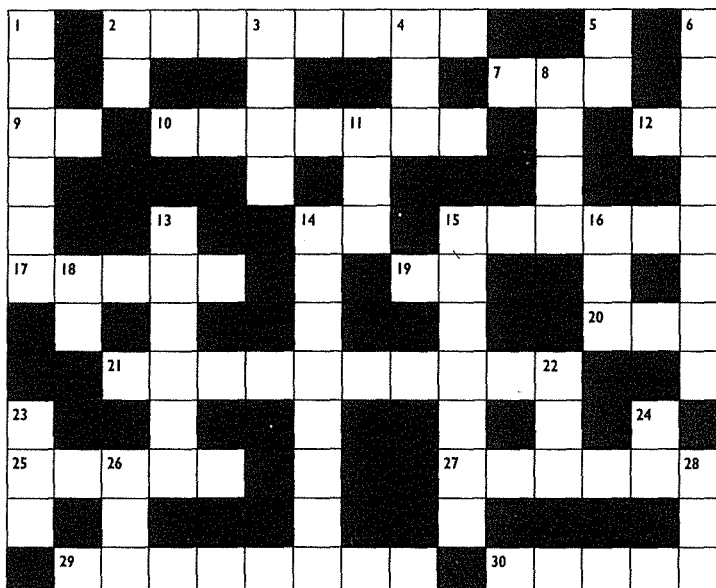
Crossword: The Earth around us

Hint: A periodic table will help with the symbols!

Clues

Across

2. The name used to describe igneous rocks formed underground: _____
7. The natural rock from which minerals are extracted: _____
9. The chemical symbol for radium: _____
10. Between mountains there are _____
12. The chemical symbol for the gas in air that is used in lights: _____
14. The chemical symbol for lead: _____
15. The layer directly below the Earth's crust: _____
17. The word meaning 'of or from the Sun': _____



19. The chemical symbol for lithium: _____
20. As grass and other organic material _____, rich humus is formed.
21. Radio waves bounce off this layer of the Earth's atmosphere: _____
25. The outermost solid layer of the Earth: _____
27. The beautiful display of lights in the sky which is caused by the solar wind and the Earth's magnetic field is called the _____.
29. When mud settles under water, it is called _____.
30. It covers over two-thirds of the surface of the Earth: _____.

Down

1. Wispy clouds are called _____ clouds.
2. The chemical symbol for palladium: _____
3. The Earth's axis is not vertical. It has a _____.
4. The waters around Antarctica are _____ cold.
5. The chemical symbol for iron: _____
6. Movements of bodies of water and air can be called _____.
8. Water falling from clouds is called _____.
11. Flowing back of the tide: _____
13. Paddles are used to move these types of boats through the water: _____
14. Barometers are used to measure _____.
15. The basic unit of a rock is the _____.
16. This material is used to surface roads. It comes from crude oil: _____
18. The chemical symbol for osmium: _____
22. The organ used for hearing is called the _____.
23. Hail is made from frozen water called _____.
24. The chemical symbol for the liquid element bromine is _____.
26. We _____ air to breathe.
28. The mixture that makes up the atmosphere of our Earth: _____



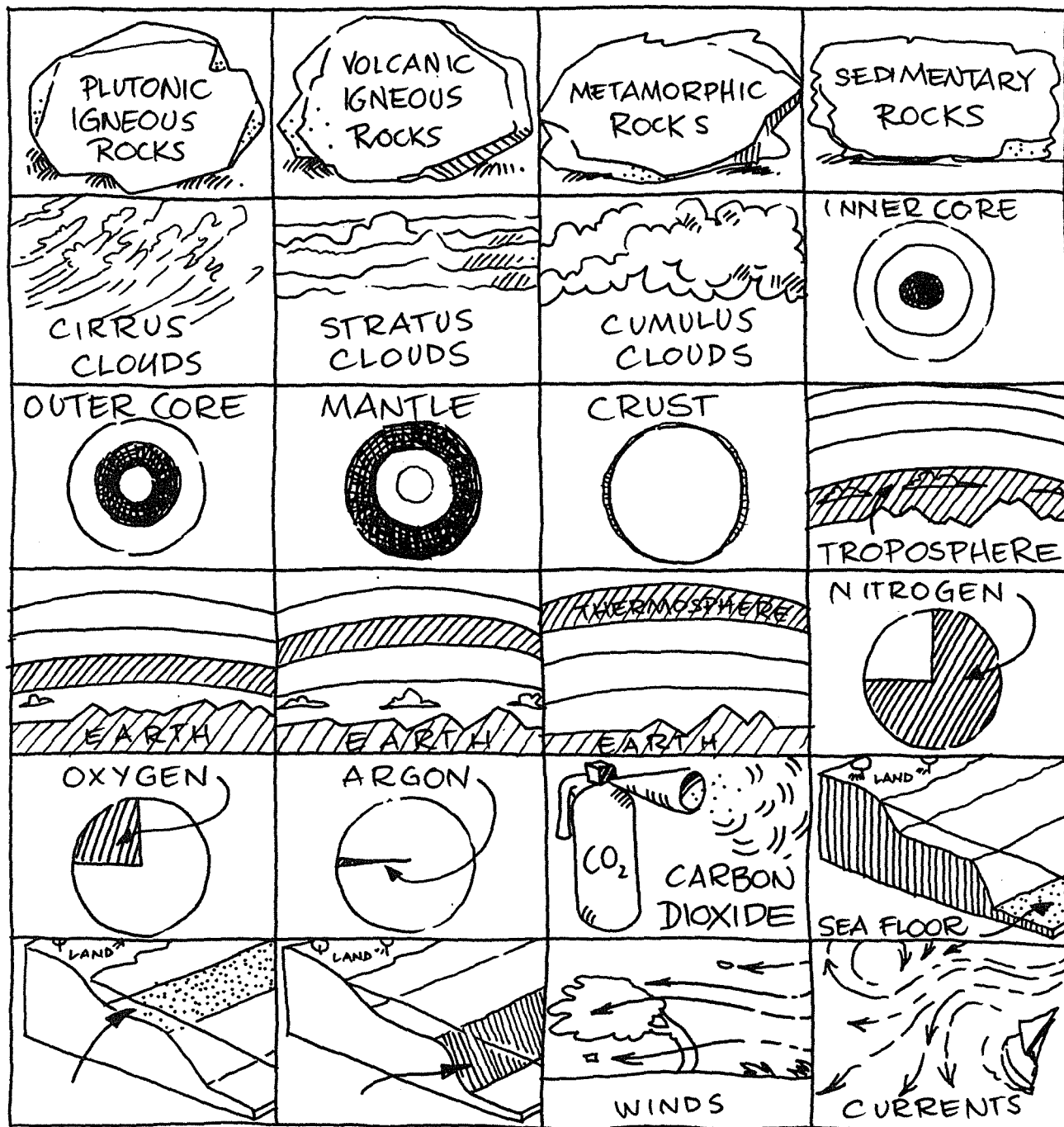
Bingo clues: The Earth around us

Rocks formed underground from molten material <i>(plutonic igneous)</i>	Rocks formed on the surface from cooled lava <i>(volcanic igneous)</i>	Rocks changed by heat and pressure <i>(metamorphic)</i>	Rocks, often layered, formed from sediments <i>(sedimentary)</i>
Wispy clouds <i>(cirrus)</i>	Fog-like clouds <i>(stratus)</i>	Fluffy clouds <i>(cumulus)</i>	Innermost part of the Earth <i>(inner core)</i>
The layer of the Earth under the mantle <i>(outer core)</i>	From the Earth's surface towards the middle of the Earth, what is the name of the layer under the outermost layer? <i>(mantle)</i>	The surface of the Earth has the same name as the outside of a loaf of bread <i>(crust)</i>	The atmospheric layer in which we live <i>(troposphere)</i>
The diagram with the stratosphere shaded <i>(Diagram with second layer up from Earth's surface shaded)</i>	The diagram with the mesosphere shaded <i>(Diagram with third layer up from Earth's surface shaded)</i>	The hottest part of the Earth's atmosphere <i>(thermosphere)</i>	The gas that makes up 78% of air <i>(nitrogen)</i>
The gas we inhale that makes up 21% of air <i>(oxygen)</i>	The gas used in welding and some electric lights that makes up just less than 1% of air <i>(argon)</i>	The gas used in some fire extinguishers; too much of this gas can cause the Greenhouse Effect. <i>(carbon dioxide)</i>	The deepest part of the ocean <i>(sea floor)</i>
The diagram with the continental shelf shaded <i>(Diagram with section of the sea beside the land mass shaded)</i>	The diagram with the continental slope shaded <i>(Diagram with sloping section shaded)</i>	Movements in air are usually called ----- <i>(winds)</i>	Movements in the ocean are usually called ----- <i>(currents)</i>

Answers are in brackets in italics. Do not read them out!!!!

To play bingo, follow the instructions given in 'Hints for using Blackline masters'.

Bingo cards: The Earth around us



Plant assimilation: Which clover has the largest number of leaves?

The largest clover isn't the four-leafed clover. Find out how many leaves it does have!

- Match the word to its correct description.
- Draw a straight line (using a ruler) between the word and its correct description.
- The line will pass through a letter giving you the secret code.

Tubes that carry water from the roots to the leaves.

Holes found mainly on the undersides of leaves.

Four things needed for photosynthesis to occur

Two things needed for respiration to occur

Tubes that carry dissolved foods from the leaves to other parts of the plant.

1. xylem

2. oxygen

3. water

4. phloem

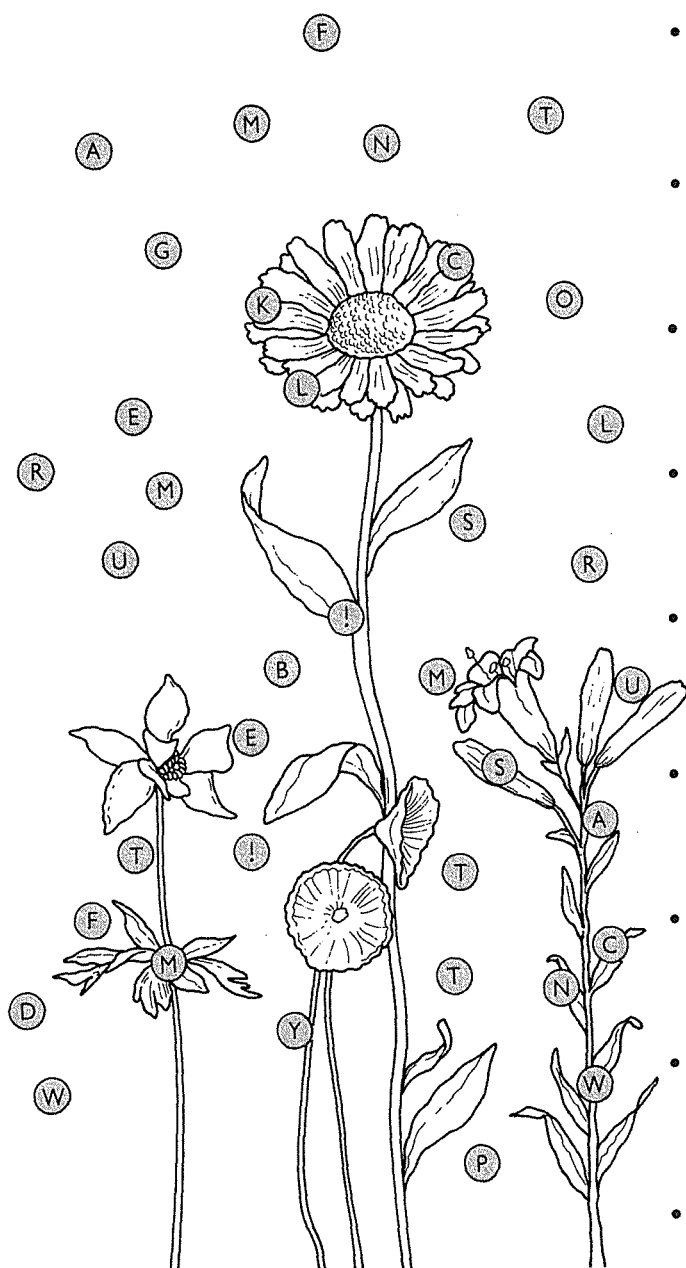
5. sugars

6. stomates

7. sunlight

8. chlorophyll

9. carbon dioxide



1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---

Extra questions

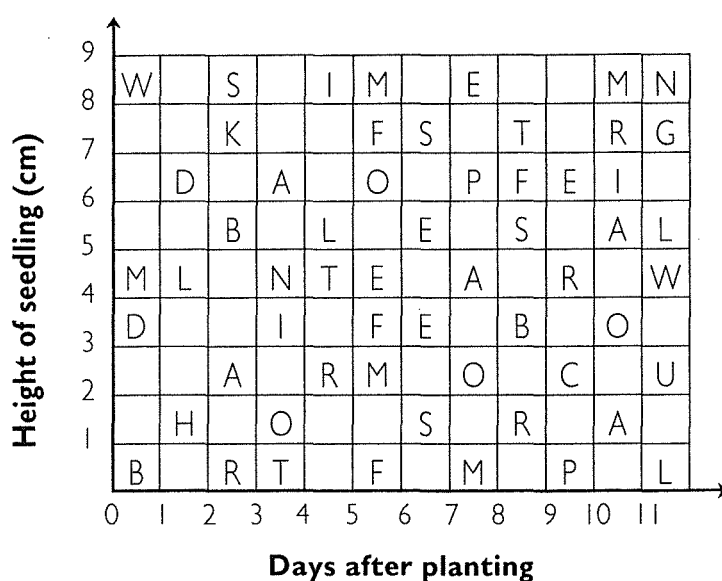
1. On the back of this sheet, write down the word equations for:
 - (a) photosynthesis;
 - (b) respiration.
2. Why is photosynthesis important for life on Earth?

What is the world's largest fern?

Use the information about the growth of a seedling to help you solve the puzzle:

- Plot the points given in the table.
- Join the points with a smooth line.
- The line will pass through letters.
- The letters spell out the answer to the question.

Days after planting	0	1	2	3	4	5	6	7	8	9	10	11	12
Height of seedling (cm)	0	0	0	0	1.5	4	5	5.5	6	6.5	7	8	9



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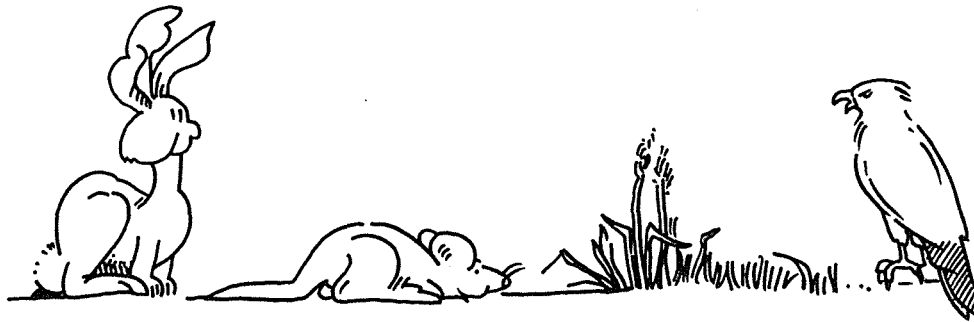
Look more closely at the line graph and answer the following questions:

1. When did the plant first appear above the ground?

2. Between which two consecutive days did the plant grow the most?

Food webs

Aboud was looking through his schoolbag for his notes about food webs. Unfortunately he discovered his notes were torn. He found the following pictures that were supposed to be stuck in his book to show a food web.



1. Write out, in the space below, the correct food web for Aboud's pictures.

2. The labels 'producer', 'herbivore' and 'carnivore' were also missing. On the food web above, write the labels under the appropriate living thing. (Note: You will need to use one of the labels twice.)

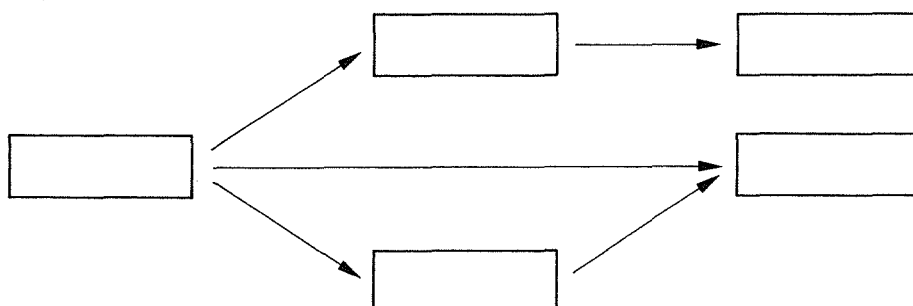
Use the food web to answer Question 3.

3. What would happen to the other living things in the food web if:

(a) there was a drought and all the grass died?

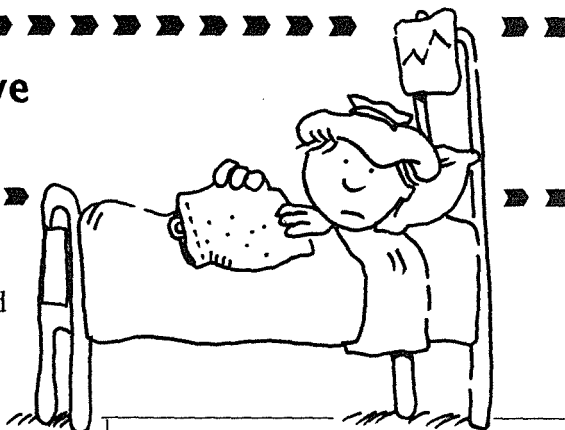
(b) a disease killed all the hawks?

4. Use the labels 'herbivore', 'carnivore', 'producer' and 'omnivore' to fill in the boxes to make a general food web.
(Note: You may need to use one or more of the labels twice.)



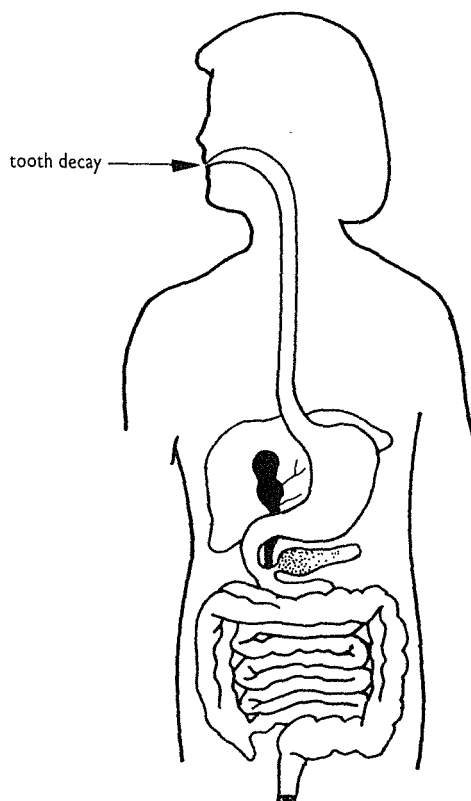
Research sheet: I feel sick! Digestive disorders and diseases

1. Use reference books to find out about the diseases and disorders listed in the table.



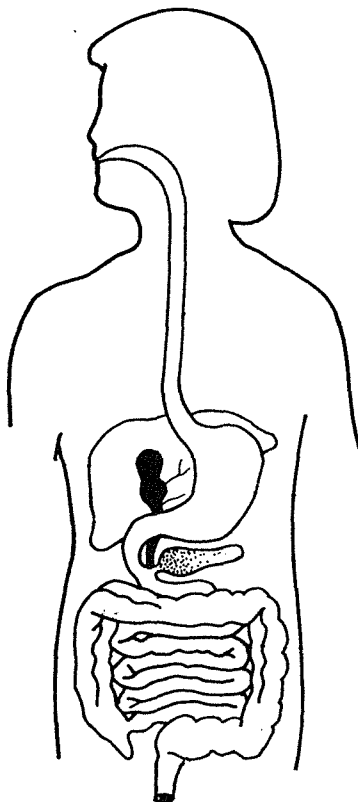
Disorder	Where it occurs	Other information
Tooth decay	mouth	Decay can be reduced by regular brushing of teeth.
Stomach ulcer		
Gallstones		
Cirrhosis of the liver		
Diabetes		
Appendicitis		

2. Use the back of this sheet to write more about one of these digestive system problems.
3. Label the parts of the digestive system affected by the disorders listed in the table.

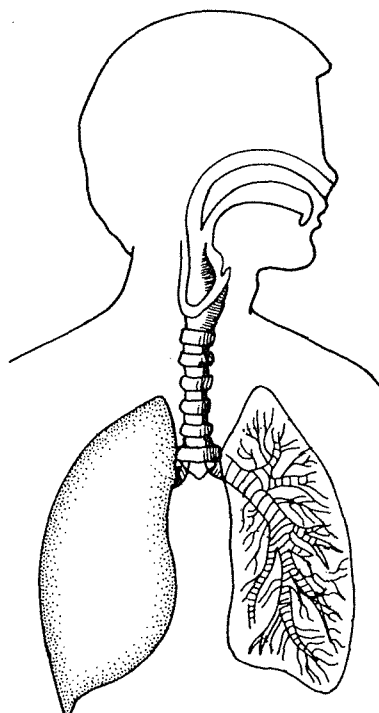


Diagrams of the digestive and respiratory systems

The human digestive system



The human respiratory system



Comprehension: Blood, the Red Cross, and you

Blood is a mixture of two main *components*. Blood is made of a straw-coloured liquid, called *plasma*, and *blood cells*. The cells are *suspended* in the plasma. There are many *red blood cells*, some *white cells*, and *fragments* of cells called *platelets*.

- Red blood cells contain a substance called *haemoglobin* (pronounced hemo-glow-bin). These red cells pick up *oxygen* from the *lungs* and carry it around the body. *Carbon dioxide* is carried back to the lungs by the plasma and some red blood cells.
- *White cells* help to protect the body. There are different types of white cells carrying out different tasks. Some surround and destroy *bacteria* while others produce special *antibodies* to help keep the body healthy.
- *Platelets* help the blood to clot.

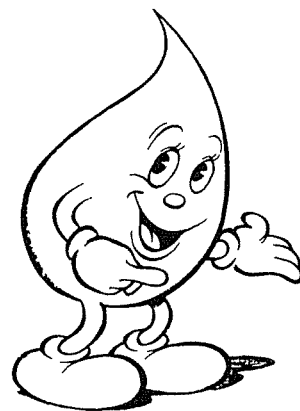
The *Red Cross* collects all these parts of the blood when blood is *donated*. In NSW, you may become a *blood donor* when you are sixteen years old with parental permission. About 430 mL of the body's approximate 5000 mL is taken. The body immediately starts to replace this lost blood, and the *volume* of blood is back to normal in a few hours.

The collected blood is then *centrifuged* and separated into its components. Each component has a special use. The red cells are used in *transfusions*. Platelets are used to control bleeding. *Whole blood* is rarely used.

Read the above passage and answer the following questions, in full sentences, in your notebook.

Questions

1. Use a dictionary or a reference book to find the meanings of the words in italics.
2. Name the two main components of blood.
3. What is the function of each part of the blood?
4. In NSW, how old do you need to be to give blood?
5. Two students are talking about giving blood. One student says it takes a week to replace donated blood. Is the student correct? Explain your answer.
6. What is the name of the process used to separate the components of blood?
7. List two components of blood and their possible uses.
8. Use some or all of the words in italics to make a word maze or a crossword.



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THE NSW RED CROSS BLOOD BANK

Matter



1. Complete the following table:

Substance	Is it a solid, liquid or gas?	Is it an element, compound or mixture?
air		
water		
lemonade		
crude oil		
table salt		
blood		
sugar		
steam		
gold		
silver		
diamond		
carbon dioxide		
soil		
magnesium hydroxide	solid	
sulfur		

2. Use the words 'volume', 'shape' and 'fill' in the correct places to complete the following sentences:

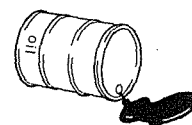
- (a) Solids have a definite _____ and volume.
 (b) Liquids have a definite _____. Liquids take the _____ of the container in which they are held.
 (c) Gases do not have a definite _____ or _____. Gases _____ any container in which they are held.

3. Write definitions for the following:

- (a) Element: _____

 (b) Compound: _____

 (c) Mixture: _____



Extension

Use as many 'matter' words as you can to make a 'find-a-word' puzzle.



Crossword: Materials

Clues

Across

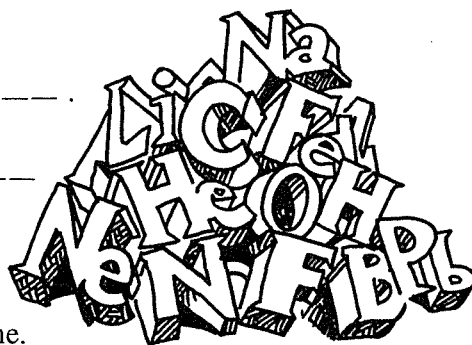
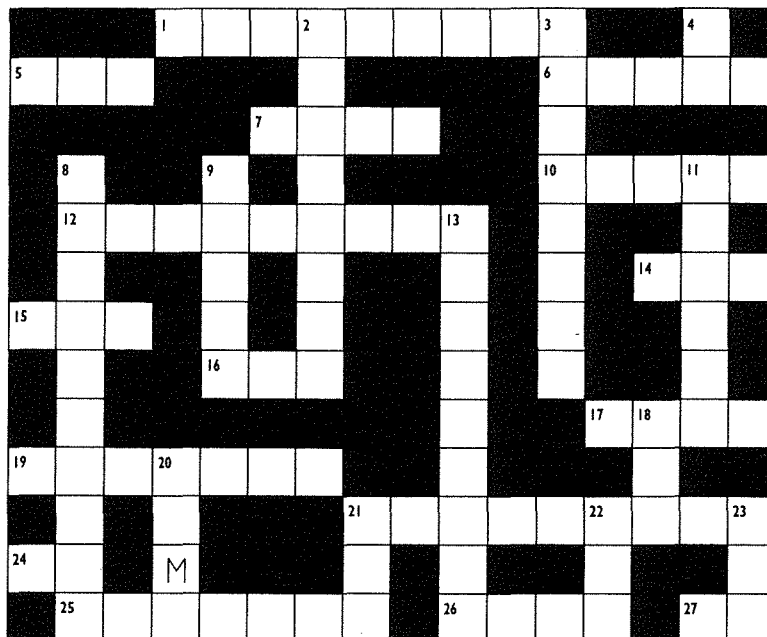
1. Elements join together chemically to form _____.
5. The three main states of matter are solid, liquid and _____.
6. To go in: _____
7. The name of the element whose chemical symbol is Fe: _____
10. The smallest 'pieces' of matter that can exist alone: _____
12. All _____ are made up of tiny particles called atoms.
14. Some stories start with 'Long, long _____'.
15. A metallic element with the symbol Sn: _____
16. Abbreviation for evening: _____
17. Make a _____ of all observations in an experiment.
19. Air is an example of a _____.
21. The reactive element sodium does not occur _____.
24. Chemical symbol for aluminium: _____
25. A substance made up of only one type of atom: _____
26. Carbon is found naturally as the fuel _____.
27. Chemical symbol for arsenic: _____

Down

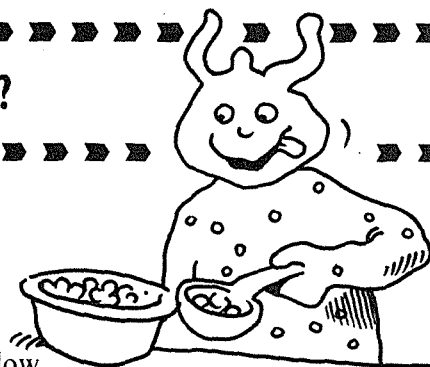
2. An atom is the smallest _____ that can exist alone.
3. We can _____ mud from water by filtration.
4. Chemical symbol for iron: _____
8. Liquids that do not mix are called _____ liquids.
9. Filtration of a solid/liquid mixture will _____ the solid in the filter paper.
11. A _____ can be used to separate iron filings from sulfur.
13. Not natural—made by people: _____
18. _____ and water do not mix.
20. Sometimes a solute needs _____ to dissolve in a solvent.
21. Do _____ run in the laboratory.
22. _____ materials are made up of atoms.
23. Is all matter made up of atoms? _____

Extension

Make up your own crossword or word maze using some or all of the following words: materials, natural, synthetic, density, physical, chemical, develop, particle, condense, solidify, electricity, property, magnetic, elements, compounds, mixtures, substances, solution, atoms.



What *is* in our food?



Substances called 'food additives' are used:

- to improve the colour and appearance of food;
- to add flavour to food;
- to preserve food so it lasts longer.

Use the following lists of food additives to answer the questions below.

The list below shows the numbers approved by the National Health and Medical Research Council for approved food additives.

No.	Food additive	No.	Food additive
100	curcumin	224	potassium metabisulfite
101	riboflavin	234	nisin
102	tartrazine	249	potassium nitrite
107	yellow 2G	250	sodium nitrite
110	sunset yellow FCF	251	sodium nitrate
120	cochineal, carminic acid	252	potassium nitrate
122	carmoisine	260	acetic acid
123	amaranth	261	potassium acetate
124	brilliant scarlet 4R	262	sodium acetates
127	erythrosine	263	calcium acetate
132	indigo carmine	270	lactic acid
133	brilliant blue FCF	280	propionic acid
140	chlorophylls	281	sodium propionate
142	green S	282	calcium propionate
150	caramel	283	potassium propionate
151	brilliant black BN	290	carbon dioxide
153	carbo medicinalis vegetalis (charcoal)	296	malic acid
155	chocolate brown HT	297	fumaric acid
160	carotenoids	300	ascorbic acid
160(a)	carotene, alpha-, beta-, gamma-	301	sodium ascorbate
160(b)	annatto (bixin, norbixin)	306	tocopherol-rich extracts of natural origin
160(e)	beta-apo-8' carotenal	307	synthetic alpha-tocopherol
160(f)	ethyl ester of beta-apo-8' carotenoic acid	308	synthetic gamma-tocopherol
161	xanthophylls	309	synthetic delta-tocopherol
161(g)	canthaxanthine	310	propyl gallate
162	beetroot red, betanin	311	octyl gallate
163	anthocyanins	312	dodecyl gallate
170	calcium carbonate	320	butylated hydroxy-anisole (BHA)
171	titanium dioxide	321	butylated hydroxy-toluene (BHT)
172	iron oxides and hydroxides	322	lecithins
200	sorbic acid	325	sodium lactate
201	sodium sorbate	326	potassium lactate
202	potassium sorbate	327	calcium lactate
203	calcium sorbate	330	citric acid
210	benzoic acid	331	sodium citrates
211	sodium benzoate	332	potassium citrates
212	potassium benzoate	333	calcium citrates
213	calcium benzoate	334	tartaric acid
220	sulfur dioxide	335	sodium tartrates
221	sodium sulfite	336	potassium tartrates
222	sodium bisulfite	337	sodium potassium tartrate
223	sodium metabisulfite	339	sodium orthophosphates

(Continued)

340	potassium orthophosphates	466	sodium carboxymethylcellulose
341	calcium orthophosphates	471	mono- and diglycerides of fatty acids
350	sodium malates	472(e)	Mono and diacetyltartaric acid esters of mono- and diglycerides of fatty acids
351	potassium malates	473	sucrose esters of fatty acids
352	calcium malates	475	polyglycerol esters of fatty acids
353	metatartaric acid	476	polyglycerol polyricinoleate
354	calcium tartrate	481	sodium stearyl-2-lactylate
355	adipic acid	482	calcium stearyl-2-lactylate
363	succinic acid	491	sorbitan monostearate
380	tri-ammonium citrate	500	sodium carbonates
400	alginic acid	501	potassium carbonates
401	sodium alginate	503	ammonium carbonates
402	potassium alginate	504	magnesium carbonate
403	ammonium alginate	508	potassium chloride
404	calcium alginate	509	calcium chloride
405	propylene glycol alginate	529	calcium oxide
406	agar	536	potassium ferrocyanide
407	carrageenan	541	sodium aluminium phosphate
410	locust bean gum	551	silicon dioxide
412	guar gum	553(b)	talc
413	tragacanth	554	sodium aluminium silicate
414	acacia	558	bentonite
415	xanthan gum	559	kaolins
416	karaya gum	570	stearic acid
420	sorbitol	572	magnesium stearate
421	mannitol	575	glucono delta lactone
422	glycerol	621	monosodium glutamate
433	polyoxyethylene (20) sorbitan mono-oleate	627	sodium guanylate
435	polyoxyethylene (20) sorbitan monostearate	631	sodium inosinate
436	polyoxyethylene (20) sorbitan tristearate	637	ethyl maltol
440(a)	pectin	900	dimethylpolysiloxane
442	ammonium phosphatides	901	beeswaxes
450	sodium and potassium polyphosphates	903	carnauba wax
460	microcrystalline cellulose, powdered cellulose	904	shellac
461	methylcellulose	905	paraffins
464	hydroxypropylmethylcellulose	920	L-cysteine and its hydrochlorides
465	ethylmethylcellulose	924	potassium bromate
		925	chlorine
		926	chlorine dioxide

SOURCE: National Health and Medical Research Council



(Continued)

1. Here are two food labels. Complete the table to give the food additives for Bonzo Jelly Crystals and Gloupy Packet Soup.

Bonzo Jelly Crystals
Ingredients:
 cane sugar, gelatine,
 food acids (297, 331)
 (nature identical)
 colour (123, 133)

Gloupy Packet Soup
Ingredients:
 tomato powder, sugar,
 starch, salt, natural
 flavour, spices,
 natural colour (150)
 food acid (citric acid)

Number of additive	Name of food additive
Bonzo Jelly Crystals	
■	
■	
■	
■	
Gloupy Packet Soup	
■	

2. Additive 621 was once widely used. What is it?

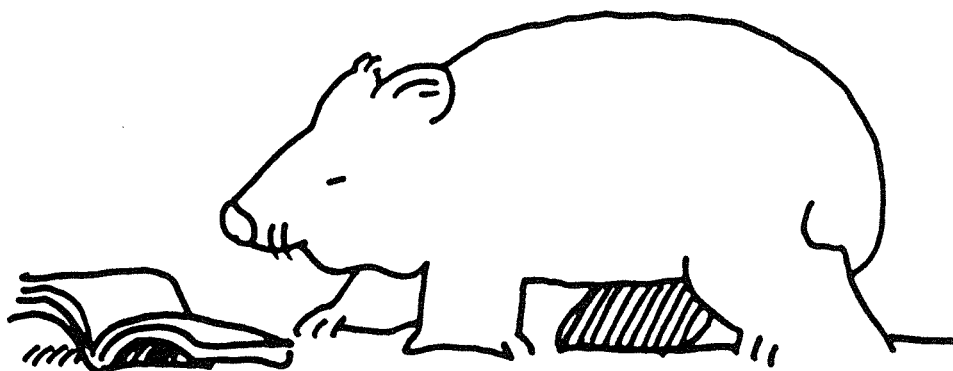
Activity

Collect food wrappers and containers. List the numbers and names of all food additives used.

Research

Some people are allergic to certain foods and food additives.

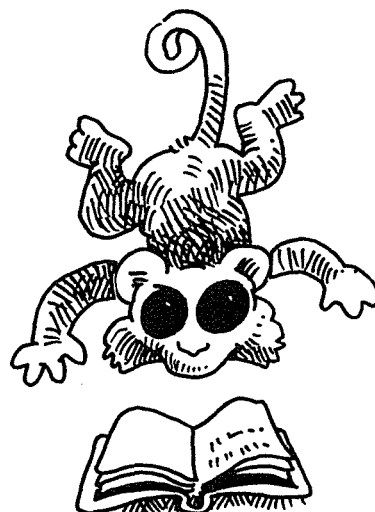
Try to find out more about one particular food additive.



'Elementary'

1. Use the periodic table of elements to find the names of the following elements:

H _____	Al _____
He _____	Si _____
B _____	S _____
C _____	Cl _____
N _____	K _____
O _____	Ca _____
F _____	Cu _____
Na _____	Zn _____
Mg _____	Au _____
Fe _____	Sn _____



2. Name six metals in the list:

_____	_____
_____	_____
_____	_____

3. Name three gases in the list:

_____	_____
_____	_____

4. Find the elements from Question 1 in the word maze. Some words are written backwards. There are other elements in the word maze too. Find these elements, and copy them down.

F	A	L	U	M	I	N	I	U	M	A	L	G
L	E	P	S	H	R	U	F	L	U	S	M	O
U	N	H	O	X	Y	G	E	N	C	U	O	L
O	I	Y	D	S	P	D	I	A	I	I	C	D
R	R	R	I	H	O	T	R	S	R	N	R	M
I	O	U	U	U	R	B	E	O	I	D	S	U
N	L	C	M	O	O	N	N	Z	G	A	P	I
E	H	R	G	N	G	C	O	P	P	E	R	L
T	C	E	C	A	L	C	I	U	M	L	N	E
I	N	M	M	U	I	S	S	A	T	O	P	H
N	S	I	L	I	C	O	N	B	O	R	O	N

Periodic table of the elements

6 Atomic number
CARBON Element's name
C Element's symbol
 12.0 Atomic mass

3 LITHIUM Li 6.9	4 BERYLLIUM Be 9.0																
11 SODIUM Na 23.0	12 MAGNESIUM Mg 24.3																
19 POTASSIUM K 39.1	20 CALCIUM Ca 40.1	21 SCANDIUM Sc 45.0	22 TITANIUM Ti 47.9	23 VANADIUM V 50.9	24 CHROMIUM Cr 52.0	25 MANGANESE Mn 54.9	26 IRON Fe 55.8	27 COBALT Co 58.9	28 NICKEL Ni 58.7	29 COPPER Cu 63.5	30 ZINC Zn 65.4	31 GALLIUM Ga 69.7	32 GERMANIUM Ge 72.6	33 ARSENIC As 74.9	34 SELENIUM Se 79.0	35 BROMINE Br 79.9	36 KRYPTON Kr 83.8
37 RUBIDIUM Rb 85.5	38 STRONTIUM Sr 87.6	39 YTTRIUM Y 88.9	40 ZIRCONIUM Zr 91.2	41 NIOBIUM Nb 92.9	42 MOLYBDENUM Mo 95.9	43 TECHNETIUM Tc [99]	44 RUTHENIUM Ru 101.1	45 RHODIUM Rh 102.9	46 PALLADIUM Pd 106.4	47 SILVER Ag 107.9	48 CADMIUM Cd 112.4	49 INDIUM In 114.8	50 TIN Sn 118.7	51 ANTIMONY Sb 121.8	52 TELLURIUM Te 127.6	53 IODINE I 126.9	54 XENON Xe 131.3
55 CESIUM Cs 132.9	56 BARIUM Ba 137.3	57-71 LANTHANUM ①	72 HAFNIUM Hf 178.5	73 TANTALUM Ta 181.0	74 TUNGSTEN W 183.9	75 RHENIUM Re 186.2	76 OSMIUM Os 190.2	77 IRIDIUM Ir 192.2	78 PLATINUM Pt 195.1	79 GOLD Au 197.0	80 MERCURY Hg 200.6	81 THALLIUM Tl 204.4	82 LEAD Pb 207.2	83 BISMUTH Bi 209.0	84 POLONIUM Po [210]	85 ASTATINE At [211]	86 RADON Rn [222]
87 FRANCIUM Fr [223]	88 RADIUM Ra [226]	89-103 ACTINIDES ②	104	105	106												

① Lanthanide series

LANTHANIDES

57 LANTHANUM La 138.9	58 CERIUM Ce 140.1	59 PRASEODYMIUM Pr 140.9	60 NEODYMIUM Nd 144.2	61 PROMETHIUM Pm 145	62 SAMARIUM Sm 150.4	63 EUROPIUM Eu 152.0	64 GADOLINIUM Gd 157.3	65 TERBIUM Tb 158.9	66 DYSPROSIUM Dy 162.5	67 HOLMIUM Ho 164.9	68 ERBIUM Er 167.3	69 THULIUM Tm 168.9	70 YTTTERBIUM Yb 173.0	71 LUTETIUM Lu 175.0
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② Actinide series

ACTINIDES

89 ACTINIUM Ac [227]	90 THORIUM Th 232	91 PROTACTINIUM Pa 231	92 URANIUM U 238.0	93 NEPTUNIUM Np [237]	94 PLUTONIUM Pu [242]	95 AMERICIUM Am [243]	96 CURIUM Cm [245]	97 BERKELIUM Bk [245]	98 CALIFORNIUM Cf [248]	99 EINSTEINIUM Es [255]	100 FERMIUM Fm [252]	101 MENDELEVIUM Md [256]	102 NOBELIUM No	103 LAWRENCIUM Lr
--------------------------------------	-----------------------------------	--	------------------------------------	---------------------------------------	---------------------------------------	---------------------------------------	------------------------------------	---------------------------------------	---	---	--------------------------------------	--	------------------------------	--------------------------------

Use the periodic table to help you with this exercise:

1. Colour in the *metals*, using a special colour (colour 1).
2. Find the elements mercury and bromine. Colour their boxes using a different colour (colour 2). These elements are liquids at room temperature.
3. There are six noble gases in the last column. Colour them in using colour 3.
4. List the six noble gases.

5. Research to find out why these gases are called 'noble'.
6. Learn the names and symbols of the first twenty elements. Have a class competition.

Separating mixtures

Scientists use a special method to separate the components of a mixture when they only have a tiny amount of the mixture. Find out what this method is called by solving this puzzle.

Rule a straight line to join the dots to match the mixture with the easy method to separate that mixture. The line will pass through a letter. This letter will help you to crack the code.

Mixture to separate

1. Salt from sea water

2. Water from sea water

3. Iron filings from talcum powder

4. Small pieces of gold from large pebbles

5. Oil and water

6. Copper sulfate from a solution with water

7. Mud from muddy water

8. Red blood cells from a blood sample

9. Chalk dust from water

Easy method to use

• separating funnel

• centrifuge

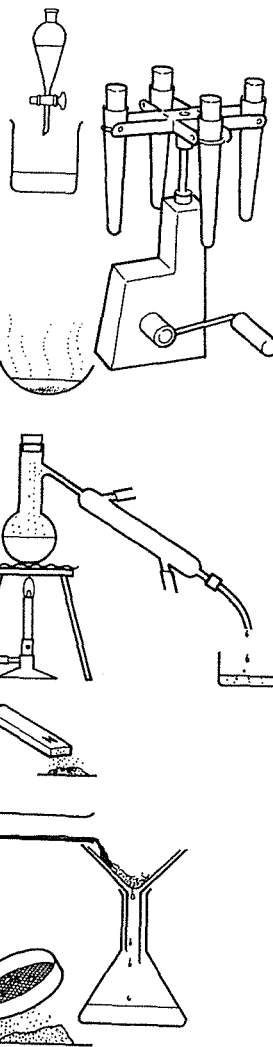
• evaporation

• distillation

• magnet

• filtration

• sieve



1	2	3	4	5	6	7	4	8	3	6	9	2	Y
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Mini-activity

A method for separating

At school you can use a strip of filter paper.

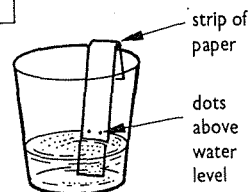
At home you can use a strip of paper towel.

Place three dots of different-coloured *water soluble** inks 2 cm from the bottom of the strip.

Dip the strip—*not the dots*—into water about 1 cm deep.

Watch what happens!

* Many 'textas' have water-soluble ink. If their marks wash off in water, they are the right type to use.



Ground water in Australia



Read the following paragraphs and answer the questions that follow.

Australia is a dry continent. In many parts of Australia, people and animals use water that comes from under the ground. This water is called 'bore water' or 'ground water'.

About 80 per cent of small towns obtain some of their water from under the ground. Some ground water has been underground for millions of years.

Salts from the surrounding soil are dissolved in the ground water. Water is called 'hard water' when salts of magnesium and calcium are dissolved in it. Hard water stops soap frothing, and the water has a strange metallic taste.

Water containing iron salts may look red or yellow, while water containing manganese salts may be black.

Undisturbed ground waters may be safe to drink providing they are not highly coloured and they taste all right. Some ground water may be polluted, so it is best to always take care.

Questions

1. What percentage of small towns use some ground water?

2. Which salts make water 'hard'?

3. List two properties of 'hard' water.

4. What colour do:

(a) manganese salts give to ground water?

(b) iron salts give to ground water?

5. What are two things to check before drinking a large amount of ground water?



Research

Suggest how the water could be purified to make it safe to drink. Discuss your answers in class.

'Chemical' bingo cards

The first twenty elements

H	He	Li	Be
B	C	N	O
F	Ne	Na	Mg
Al	Si	P	S
Cl	Ar	K	Ca

Clues for 'chemical' bingo

- For beginning students, simply make 3×2 or 3×3 bingo boards. The clues will simply be the names of the elements.
 - For more advanced students, the atomic number of the elements could be used as clues.
 - For senior students, descriptions of the elements or the group and period numbers could be given.
- More elements may also be included to increase the number of cards.
Keep this bingo game for all levels.

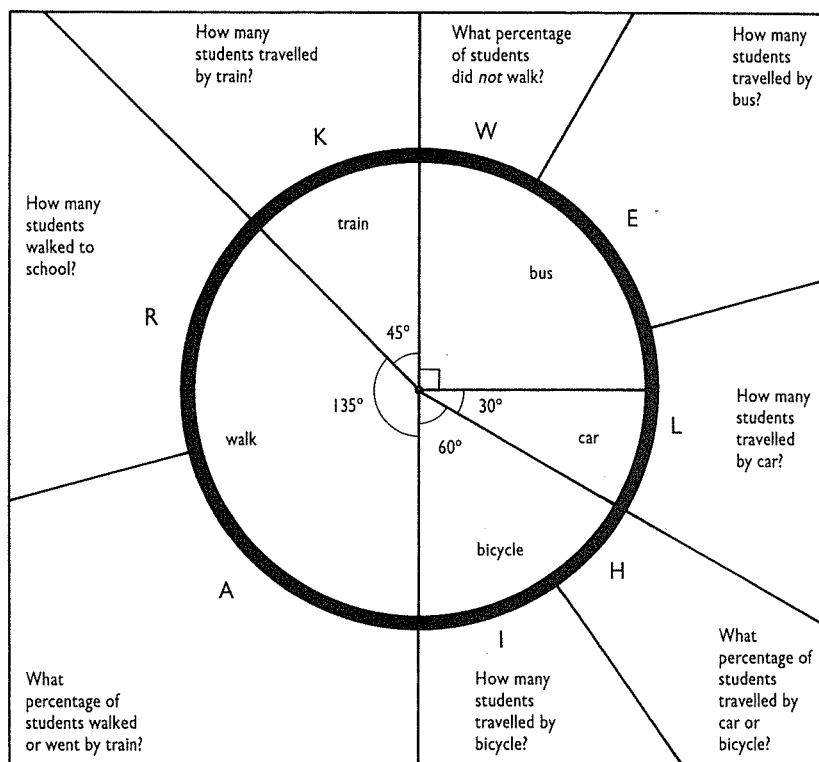
A harder puzzle: What is the fastest moving marine mammal?

It can move at more than 50 km/h.



Answer the questions, about the way the class of twenty-four students came to school, to find out.

The whole circle = 24 students

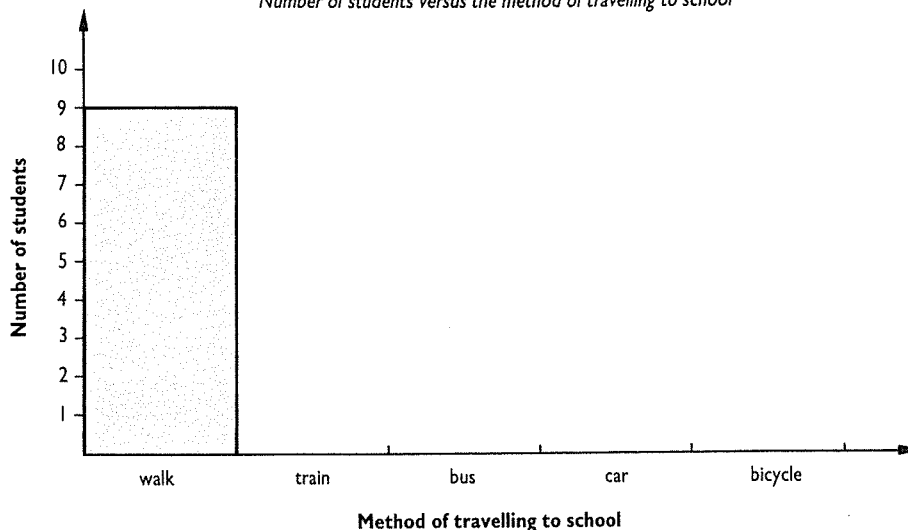


3	4	2	2	6	9
---	---	---	---	---	---

62.5	25	50	2	6
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Now complete the histogram (bar graph).

Number of students versus the method of travelling to school



The cost of \$moking



Read the following information and answer the questions below.

Let us consider the cost of a particular lady's smoking habit. Suppose:

- the lady smokes one packet of cigarettes each day;
- her packet of cigarettes costs \$3.50;
- she lives to be 63 years of age and she started smoking when she was 13 (i.e. she has smoked cigarettes for fifty years).

All this information means that *in her lifetime*, with no price rises considered, she will have spent:

$$\begin{array}{r} \$3.50 \text{ (cost of one packet of cigarettes)} \\ \times \quad 365 \text{ (days in a year)} \\ \times \quad 50 \text{ (years)} \\ \hline = \$63\,875 \text{ or approximately } \$64\,000 \text{ on cigarettes alone} \end{array}$$

This cost of smoking is still not accurate, because smokers are away from work more than non-smokers. In Australia, people usually get sick pay, so the lady will be costing her employer money when she is ill.

There are other costs to the community caused by people smoking. Smokers sometimes retire early due to ill health, and these people are paid a pension. The pensions come from taxes.

Another major cost of smoking is the lives lost and damage caused by fire. People, animals, buildings and many hectares of vegetation are lost because of carelessness with matches and cigarettes.

Questions

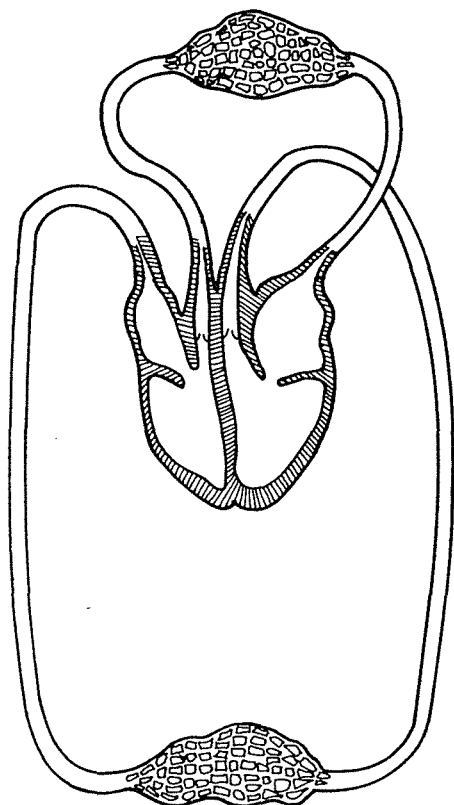
1. How much did the lady's cigarettes cost over the fifty years?
2. How much would two packets of cigarettes a day over fifty years cost?
3. List three problems caused by smoking.
4. Design a poster to encourage young people *not* to smoke.

Research

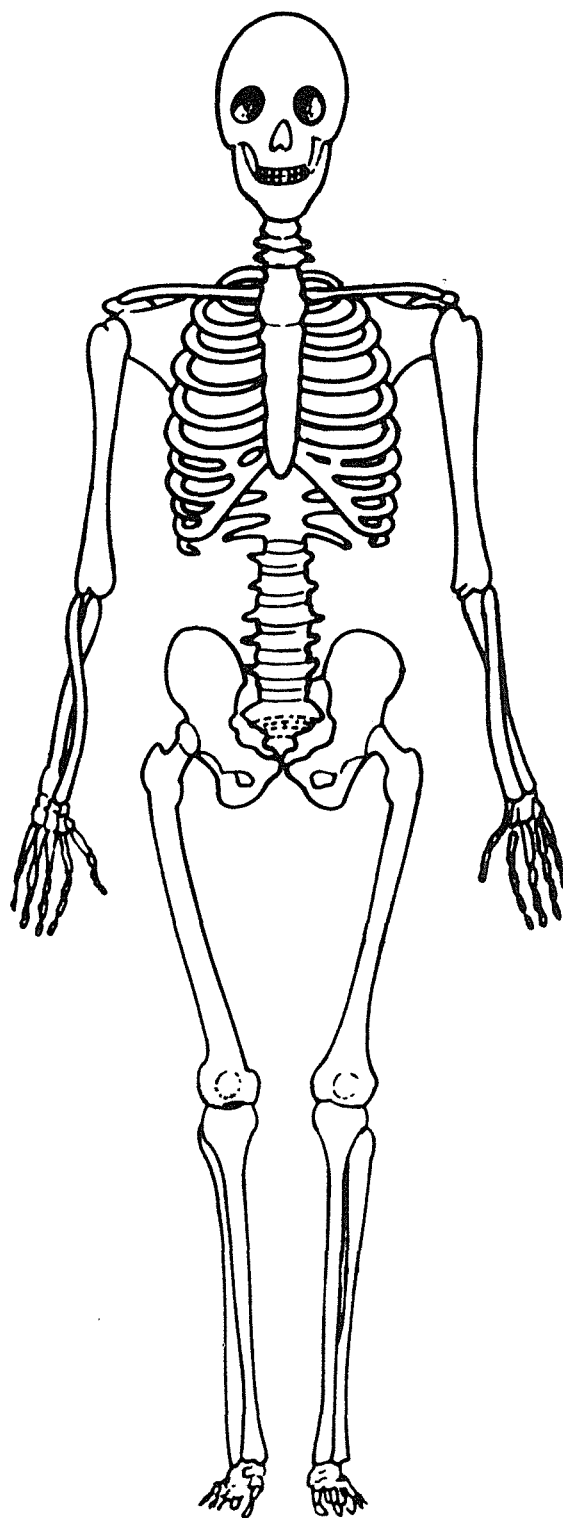
Ask a smoker to tell you how many packets of cigarettes he or she smokes each week. Calculate the cost of these cigarettes over fifty years (using today's prices).

Diagrams of the circulatory system and the skeleton

The circulatory system



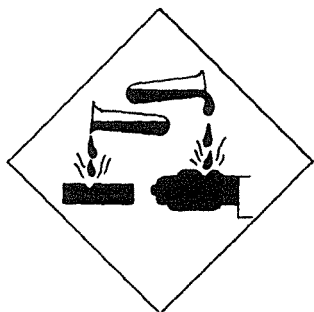
The human skeleton



A research sheet: Danger signs

Hazard warnings appear on chemical containers and on trucks carrying chemicals. Under each label:

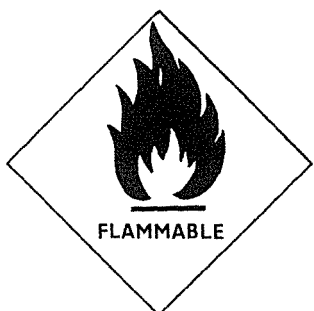
1. write what you think the label means;
2. give an example of a substance that may have the symbol.



CORROSIVE



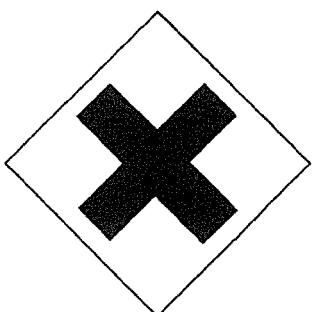
TOXIC



FLAMMABLE



OXIDIZING



HARMFUL



RADIOACTIVE

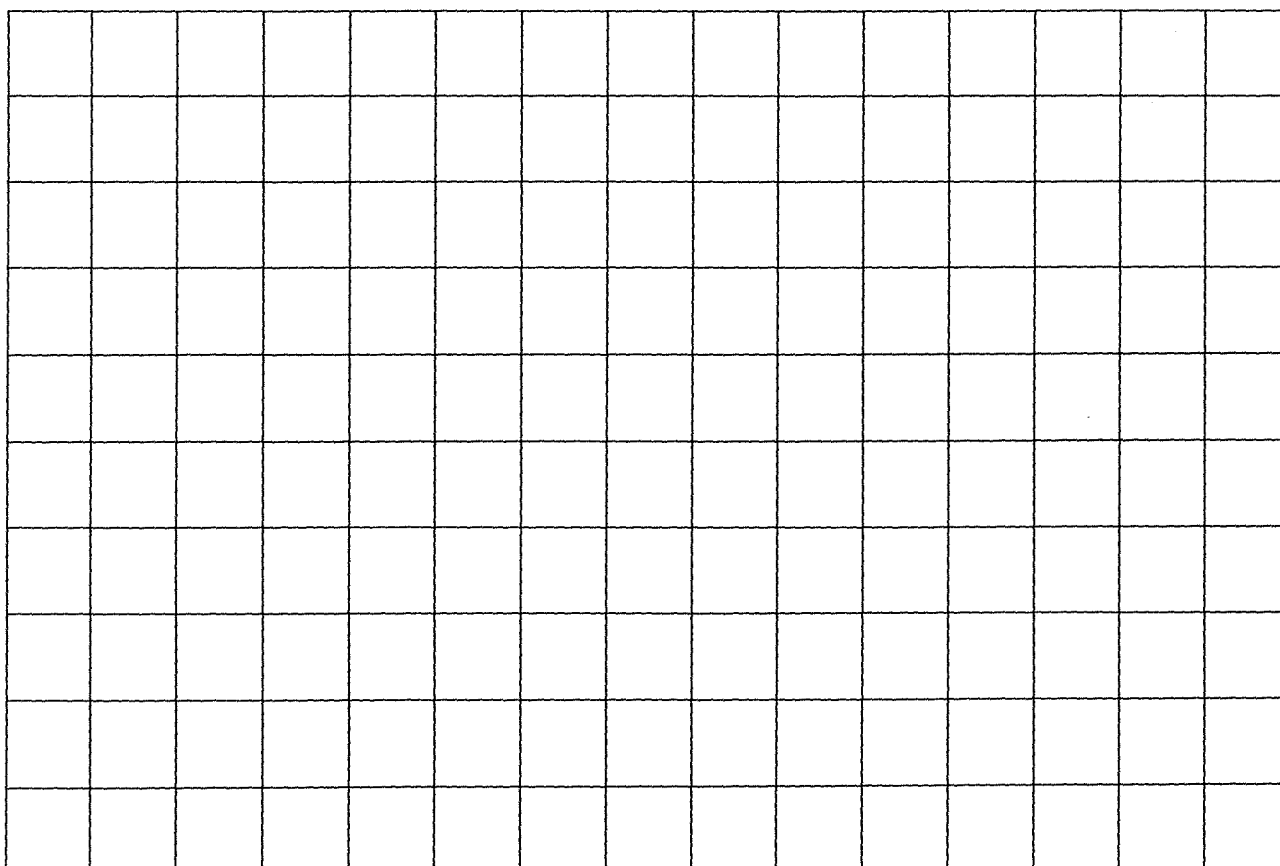
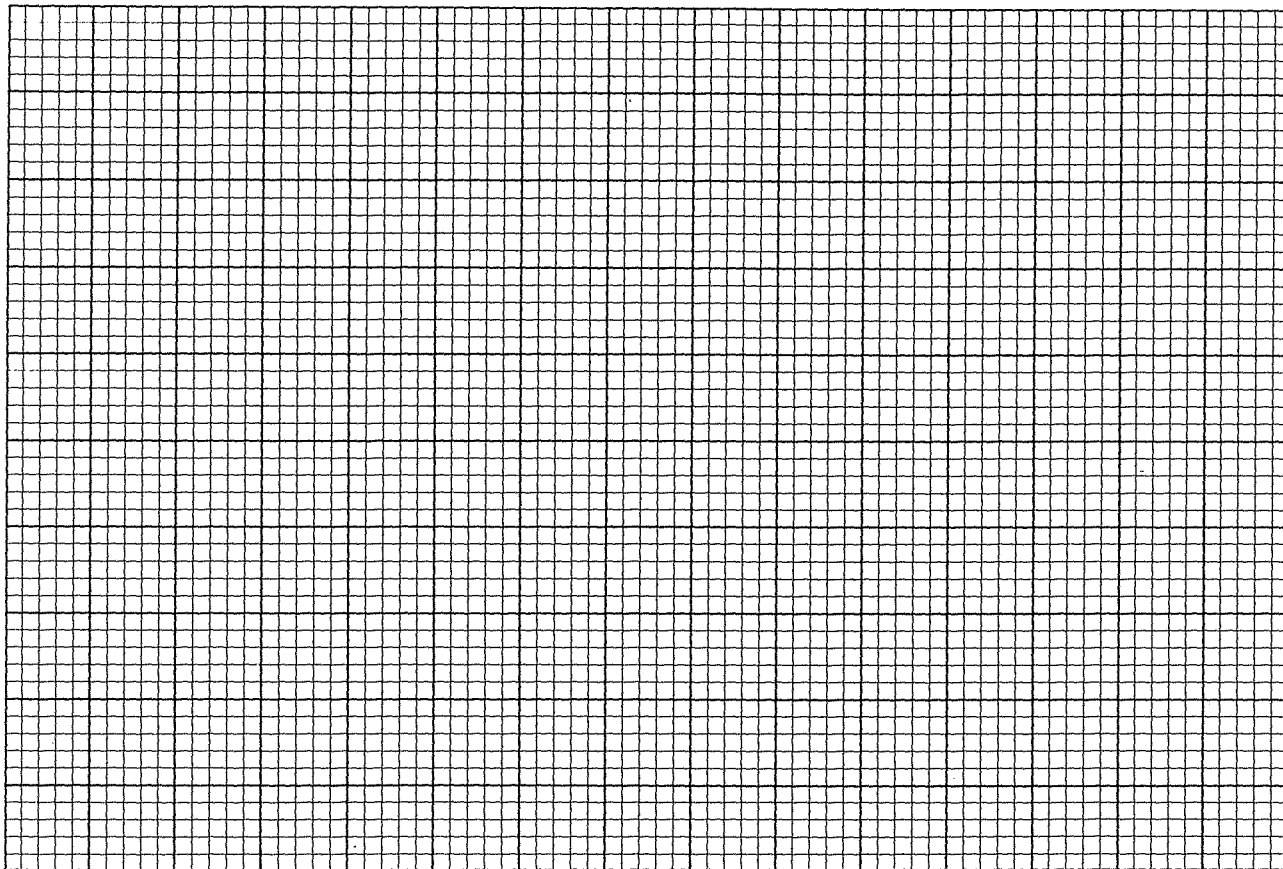


EXPLOSIVE



**HARMFUL—
STOW AWAY
FROM FOODSTUFFS**

Graph paper and grid for student use



Bingo board squares

Photocopy onto sturdy paper and cut board to required size.

Remember: Rectangles can be shaded or left blank, according to the number required for a particular bingo game.

Answers to Blackline masters

BLM 1: Are you a good safety officer?

2. (a) Turn off the gas tap, taking care not to burn yourself.
- (b) Use sand from the sand bucket to smother the flames.
- (c) This is a difficult question and the answer should be discussed thoroughly. If the hair is very long, it may be possible to wrap the burning hair in the fire blanket. Students are taught 'STOP, DROP, ROLL', but care must be exercised so that other areas of the body are not burned.
- (d) Burnt fingers should be placed under cool, running water. Ice should not be used. Help should be obtained from a person qualified to deal with burns, e.g. the school nurse. A trip to the local doctor may be necessary.
- (e) Liquids on the floor may cause people to slip. Clean up all spills as quickly as possible.
3. It is much safer to stand when doing experiments with chemicals because it is easier to move away quickly if an accident does occur.
4. Often litter is *forced* into bins, and if the bin contains broken glass, cuts may occur. A special bin encourages people to take special care when handling the contents.

BLM 2: Danger in the laboratory

1. *Dangers:*
 - (a) Student's long hair near a Bunsen burner.
 - (b) Student holding burning paper.
 - (c) Student leaning across bench towards the window, very close to a beaker and a flask.
 - (d) Liquid spilt on the floor.
 - (e) Power lead trailing over the floor and over the spilt liquid.
 - (f) Food and drink on the bench beside the acid.
 - (g) Beaker with stirring rod on the edge of the bench.
 - (h) Bunsen burner alight with no-one watching it.
 - (i) Student sitting on the bench.
2. Differences between the pictures include:
 - (a) Label on bottle missing.
 - (b) Bow in student's hair.
 - (c) Extra beaker on the bench.
 - (d) One sandwich missing.
 - (e) Juice in the bottle in one picture, lemonade in the other picture.
 - (f) Student with two socks pulled up in one picture, and only one sock in the other picture.
 - (g) Evaporating basin being heated over a Bunsen burner in one picture and a beaker being heated in the other picture.

- (h) Double powerpoint in one picture and a single powerpoint in the other picture.
- (i) Apple replaced by an orange.
- (j) Cupboard handle present in only one picture.
- (k) Window handle present in only one picture.
- (l) Minor differences in students' clothing.

BLM 3: Equipment jumble

1 and 2. The picture contains:

- (a) 3 funnels
- (b) 3 gauze mats
- (c) 3 beakers
- (d) 2 Bunsen burners
- (e) 5 test tubes
- (f) 3 conical flasks
- (g) 2 measuring cylinders

BLM 4: Equipment, equipment, equipment

A. Pieces of equipment:

- | | |
|------------------------------|-----------------------------|
| 1. beaker | 7. evaporating basin (dish) |
| 2. measuring cylinder | 8. Bunsen burner |
| 3. conical flask | 9. tongs |
| 4. (a) retort stand | 10. tripod |
| (b) bosshead | 11. gauze mat |
| (c) clamp | 12. test tube |
| 5. test tube holder | 13. filter paper |
| 6. funnel (or filter funnel) | |

B. Equipment needed:

1. To evaporate a solution using a Bunsen burner: Bunsen burner, evaporating basin, gauze mat, matches or gas gun to light the gas.
2. To filter muddy water: beaker to hold the water, filter funnel, filter paper, conical flask to collect the filtrate. Optional extras include: tripod to safely support the funnel, stirring rod to direct muddy water to the centre of the filter paper.
3. To measure a volume of water: container holding the water, measuring cylinder.

C. See the textbook for the necessary diagrams.

BLM 5: The Bunsen burner—a cut-and-paste sheet

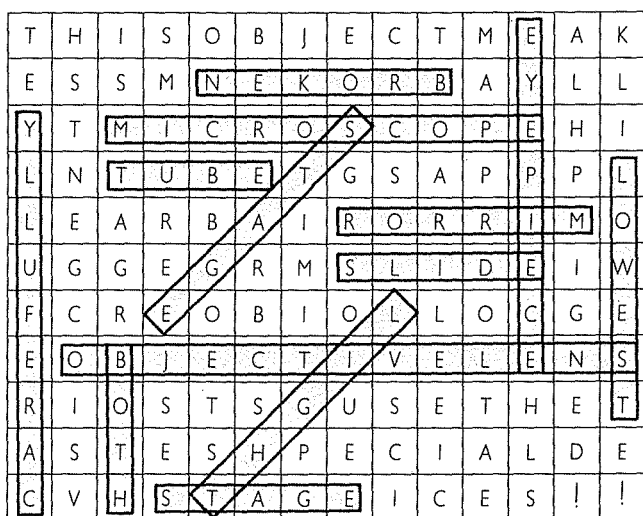
1. Labels:
 1. tube 2. sleeve 3. airhole 4. tubing (or simply 'to gas')
 5. base
2. How to safely light a Bunsen burner:
 - Attach the rubber tubing to a gas tap.
 - Close the airhole.
 - Light the match.

- Turn on the gas.
- Light the Bunsen burner.
- Adjust the flame.

3. Airhole closed should give a long, yellow, safety flame. Airhole open should give a heating flame, with a blue cone in the centre.

BLM 6: The microscope

1. (a) eyepiece (b) tube (c) objective lenses (d) stage (e) mirror
2. (a) CAREFULLy (b) mICROSCOPE, BOTH (c) LIgHT (d) SLIdE, STAgE (e) BROKEEn (f) IOWEST
3. (b) The remaining message is: This object makes small things appear bigger. Microbiologists use these special devices!!



BLM 7: A famous scientist of the twentieth century

Answer: Albert Einstein

BLM 8: 'Beginning science' review

The missing letters are indicated by capital letters:

tAKE, bAGS

wRITE, aIM, hYPOTHESISs, aPpARATUS, mETHOD, cONcLUSION, dIAGRAm, dIScUsSION

sEnSe, hELp, sIT

BUNSEN bURNER, uSE, hAIr

cLeAr

eAT

sLIp

tApS

bREAk, vitAl

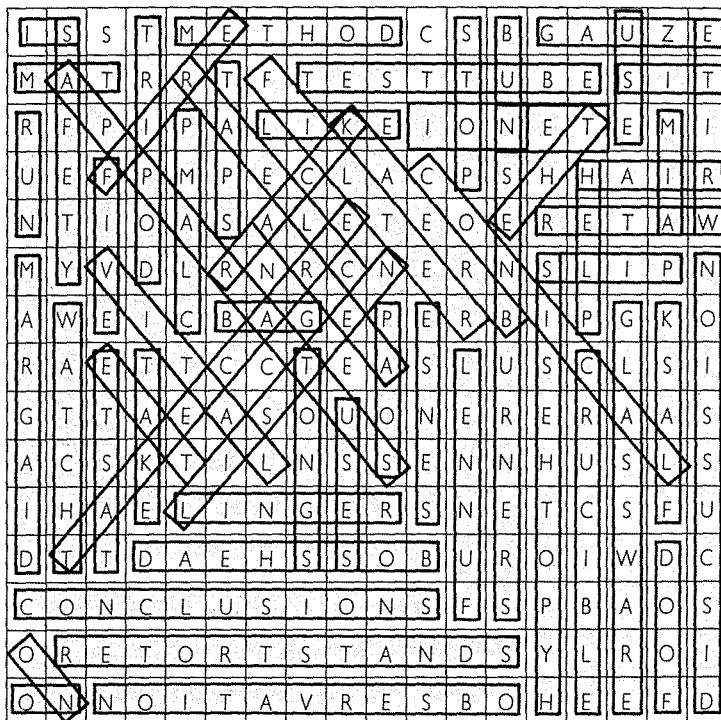
gLASsWARE, sOAp, wATER

NO, IINger

BLACKLINE MASTERS

Other equipment names in the puzzle include the following: tripod, filter, rack, test tube, clamp, retort stand, bosshead, tongs, funnel, crucible, gauze/mat, conical/flask. (The last two sets of words are separate in the puzzle, but they are near each other).

Other words in the puzzle include the following: safety, watch, take, stop, help, uses, observation, like, taste, care, the, us, on, food, listen, fire.



BLM 9: Planetary fun puzzle: Who was the first person in space?

Answer: Yuri Gagarin

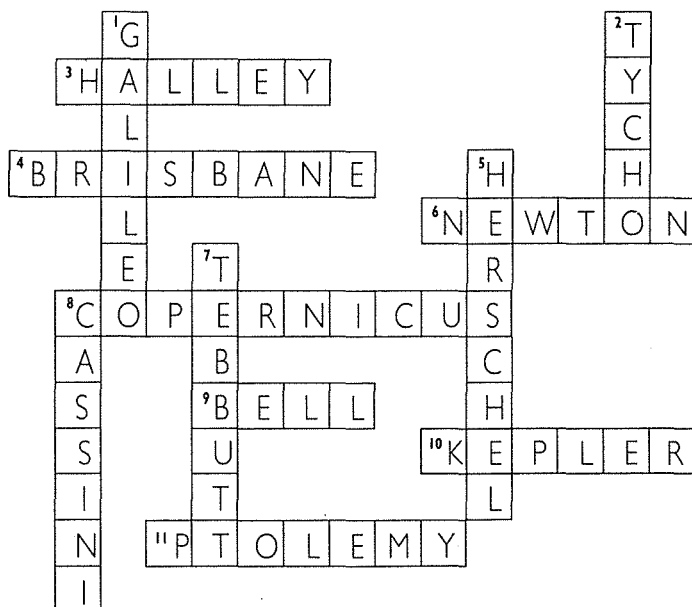
BLM 10: The famous 1969 lunar mission

Any sensible answers should be accepted here, as it is a thinking exercise. Sample answers could include the following:

1. (a) Water-cooled underwear helped to keep the astronauts' skin temperature constant.
- (b) A fire-retardant suit was a safety precaution in case of fire. *Note:* Re-entry into the Earth's atmosphere involves a vast amount of heat for the spacecraft, so extra precautions were also needed for the astronauts.
- (c) Two layers were used to ensure the astronaut was still in an enclosed system even if one layer was accidentally damaged.
- (d) Food and drink had to be packaged in special ways because there was little or no gravity in the spacecraft. Foodstuffs were packaged to ensure liquids and solids were contained in their packages so that damage to delicate instruments in the cramped environment would be avoided. (Drinks in sealed boxes are a by-product of the space program.)

2. The weight of each astronaut's suit on Earth was 82 kg. (A practical example might help here. Show students a kilogram mass to emphasise the magnitude involved.) On the Moon, each astronaut's suit would have weighed approximately $82/6 \text{ kg} = 13.7 \text{ kg}$. The suit weighs less than on Earth because the gravity is lower. The astronauts could move and jump around easily on the Moon.

BLM 11: Crossword: Famous astronomers



Word list

Ptolemy, Cassini, Herschel, Tycho, Galileo, Brisbane, Newton, Halley, Copernicus, Bell, Kepler, Tebbutt.

Additional word list

Cook, Aristarchus, Aristotle, Hubble.

BLM 12: By Jupiter! What a lot of moons!

- See graph on p. 88.
- Io, Europa, Ganymede, Callisto
 - Galileo's telescope was not as technically advanced as those of today.
- Io has active volcanoes.
Europa is sometimes called a 'cosmic billiard ball' because it has a smooth, icy surface.
Ganymede is the biggest moon in the solar system, being larger than the planet Mercury.
Callisto has a surface covered with craters.

BLM 13: Time in the solar system

- The time taken by a planet to rotate once about its axis is called a 'day'.
 - The time taken by a planet to revolve once about the Sun is called a 'year'.

- Venus
 - Pluto
- Jupiter and Saturn
 - Mercury
- 1 day on Neptune = 16 Earth hours,
so $\frac{1}{2}$ day on Neptune = 8 hours
1 day on Uranus = 24 Earth hours,
so $\frac{1}{2}$ day on Uranus = 12 hours
The Uranian sleeps longer.
- 1 year on Mars = 1.9 Earth years,
so 10 years on Mars = 19 Earth years.
The Martian is older.
- 1 year on Mercury = 88 Earth days
so 10 years on Mercury = 880 Earth days
 ≈ 3.5 Earth years
The person on Earth attended school the longer.

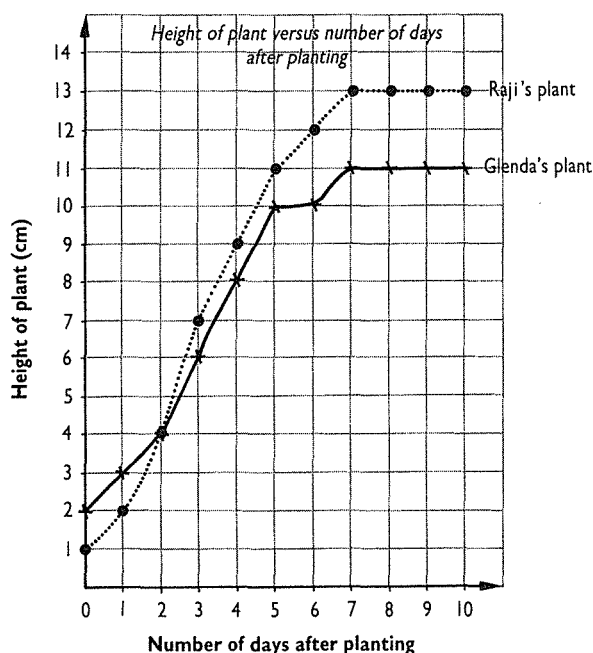
BLM 14: Plant family: What is the tallest standing hardware tree in the world?

Answer: The mountain ash

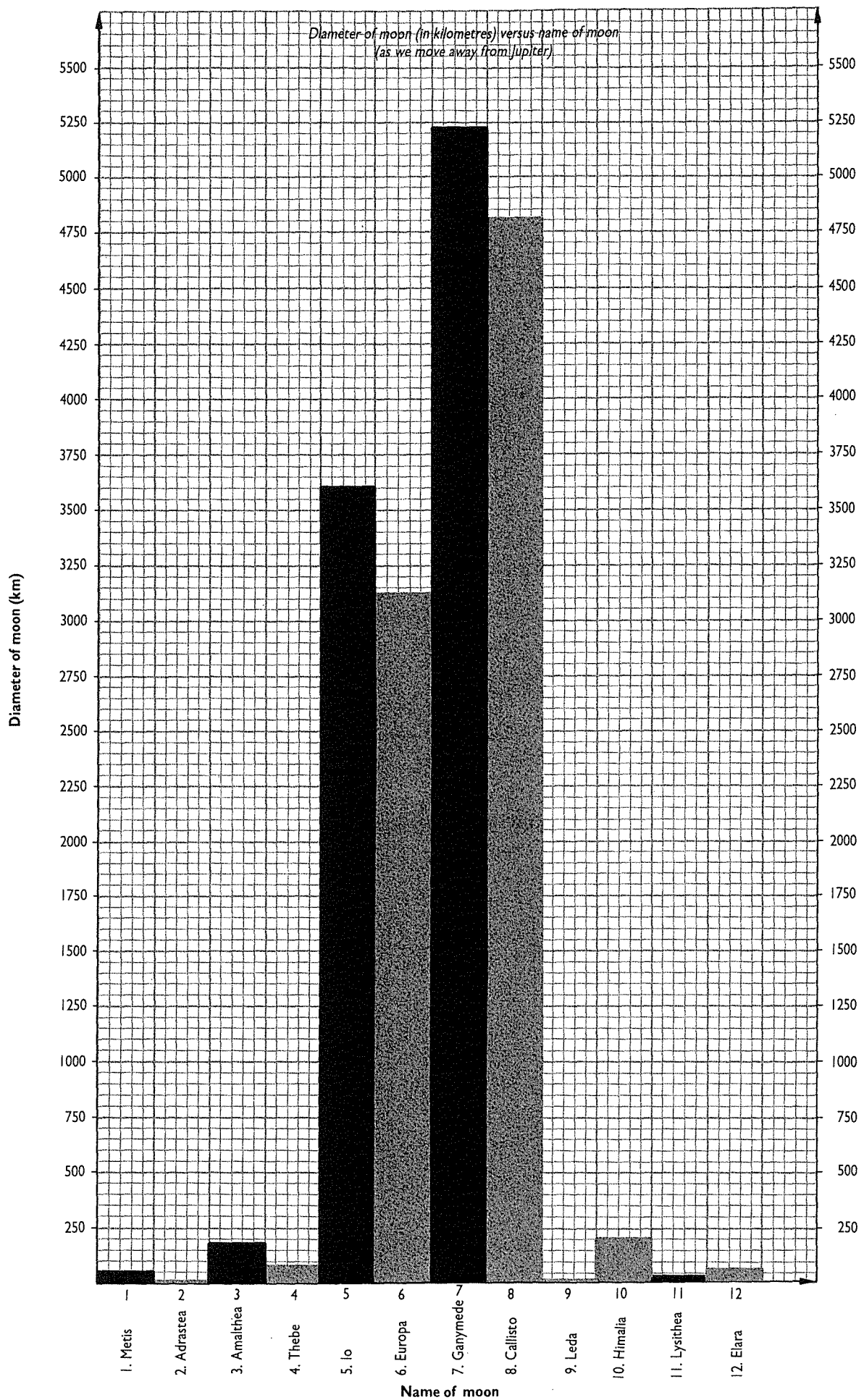
BLM 15: Growth of plants

Note: It has been assumed that both plants were the same type and size at the beginning of this activity.

1 and 2.



- Day 2
- Day 7
 - (i) 13 cm (ii) 11 cm
- Raji's plant probably had fertiliser added to it because his plant grew quicker than Gloria's after that time.
- The plants might be expected to turn yellow and die because they received no light.



BLM 16: Invertebrates: What is the most dangerous ant in the world?

Answer: The bulldog ant

BLM 17: Who am I? The Aztecs call me 'water monster'

Answer: Axolotl

BLM 18: Crossword: Living things



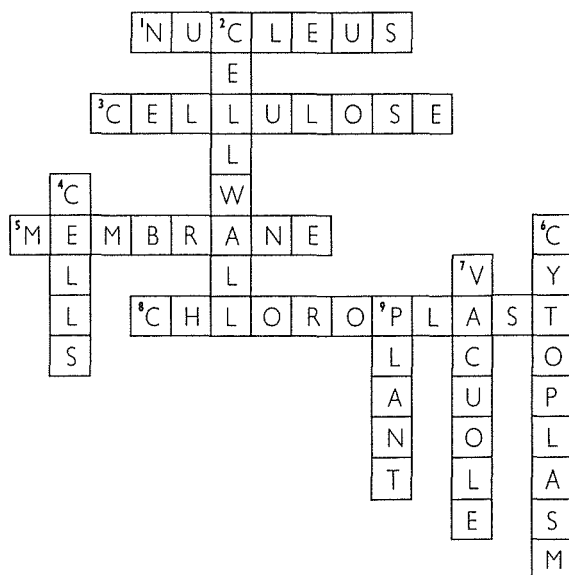
Word list

track, cells, dry, vacuole, mobile, chase, vertebrates, nucleus, cytoplasm, call, or, follow, classification, structure, bird, ear, bats, pollination, criteria, shell, spores, err, follow, car, respond, palm, raft, ice, land, no, reeds.

Additional word list

chlorophyll, seeds, reptile, snake, green, send, reproduce, animal, plant, arid, cell.

BLM 19: Crossword: What's what in a cell?



Word list

nucleus, vacuole, cells, cellulose, cell wall, membrane, chloroplast, plant, cytoplasm.

Additional word list

chlorophyll, magnify, supports.

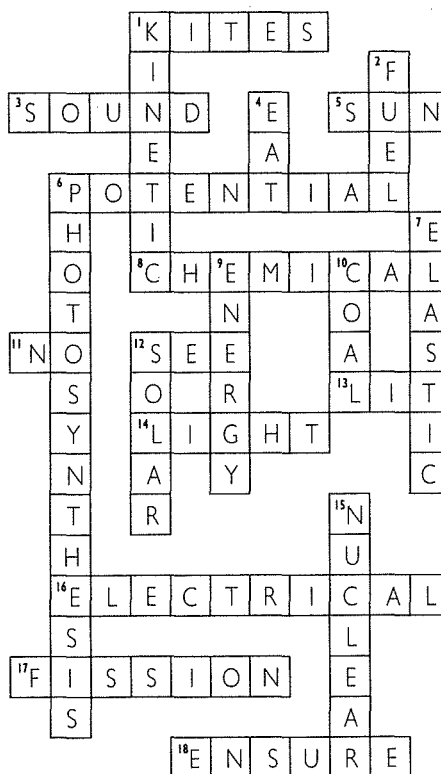
BLM 20: Animal hunt

Animals include a koala, kangaroo, wallaby, bat, wombat, frill-necked lizard, goanna, possums, sugar glider, bird (parrot), echidna, snake, and native cat.

BLM 21: Comprehension: Salvinia and the weevil

- Salvinia is a water fern.
- Salvinia covers the surface of the water, so aquatic life beneath the water dies.
- Herbicides kill salvinia, but it regrows quickly. Also, herbicides are expensive.
- Salvinia is controlled by the larvae of weevils.

BLM 22: Crossword: Energy words



Word list

elastic, energy, chemical, fission, ensure, electrical, light, photosynthesis, no, kites, eat, sound, solar, fuel, nuclear, lit, coal, sun, potential, kinetic, see.

Additional word list

static, law, conduct, convection, oil, Moon, Earth.

BLM 23: Energetically speaking

- Note:* 1. Some students will want to use a calculator for this exercise but it is not really necessary.
2. For calculation of each student's energy use, it may be necessary to approximate the energy use for other sports and activities not listed in the table.

Tricia's exercise

Tennis for 30 min = $30 \times 30 = 900$ kJ
Surfing for 30 min = $30 \times 35 = 1050$ kJ
Walking for 50 min = $50 \times 25 = 1250$ kJ
Total energy use = 3200 kJ

Jim's exercise

Jogging for 30 min = $30 \times 60 = 1800$ kJ
Dancing for 30 min = $30 \times 30 = 900$ kJ
Swimming for 40 min = $40 \times 35 = 1400$ kJ
Total energy use = 4100 kJ

Which person used more energy? Jim.

BLM 24: Energy puzzle: Where is the windiest place on Earth?

Answer: Commonwealth Bay, Antarctica

BLM 25: Energy 'find-it'

The types of energy shown include:

- heat energy from the hot water and from the toaster when it is turned on;
- electrical energy from the powerpoint;
- sound energy from the radio and from the singing bird;
- kinetic energy of the animals as the dog chases the cat, which in turn chases the mouse;
- kinetic energy of the running water;
- kinetic energy of the person eating;
- elastic potential of the bird on the spring;
- radiant energy as heat and light from the Sun and from the electric heater;
- chemical energy in the plant, in the person, and in the food;
- gravitational potential of everything above the ground—the items on the table, on the bench and so on.

BLM 26: Where was the world's first major tidal power station built?

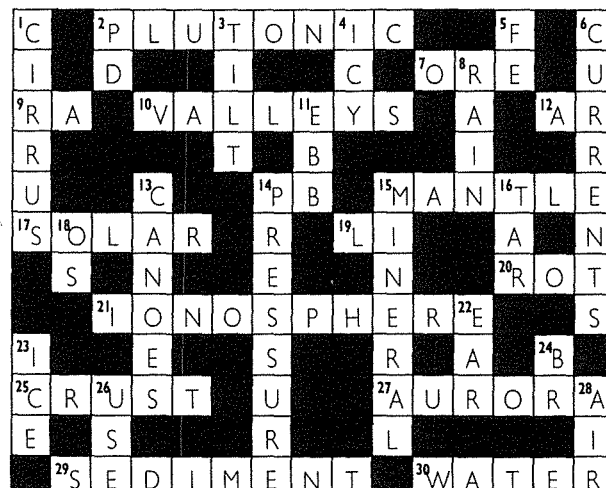
Answer: Brittany, France.

BLM 27: A famous Australian explorer and scientist

- | | |
|--|-------------|
| 1. Flat areas of land | plains |
| 2. Rocks which are often found as layers. | sedimentary |
| 3. Basic units of rocks. | minerals |
| 4. Rain falls from these. | clouds |
| 5. Type of igneous rock formed underground. | plutonic |
| 6. Name given to fluffy white clouds. | cumulus |
| 7. Air is a mixture of these. | gases |
| 8. Rock layer immediately below the Earth's crust. | mantle |
| 9. Igneous rocks may come from these. | volcanoes |
| 10. The outermost solid layer of the Earth. | crust |
| 11. Rocks changed by heat and pressure are called: | metamorphic |
| 12. Device used to measure air pressure. | barometer |
| 13. The season when there is the most ice at Antarctica: | winter |
| 14. Important substance dissolved in sea water: | salt |
| 15. The main gas in air: | nitrogen |
| 16. Type of landform: | mountain |

Answer: Sir Douglas Mawson

BLM 29: Crossword: The Earth around us



Word list

valleys, mantle, ionosphere, crust, use, air, sediment, Pb, solar, currents, aurora, rain, Ar, ear, Os, Fe, ore, plutonic, Pd, pressure, ice, water, Br, rot, Li, mineral, canoes, tar, icy, tilt, Ra, cirrus, ebb.

Additional word list

eye, nuclear, atmosphere, rock, river, or, igneous, not, tor, volcanic, mesosphere, nimbus, layers, ocean.

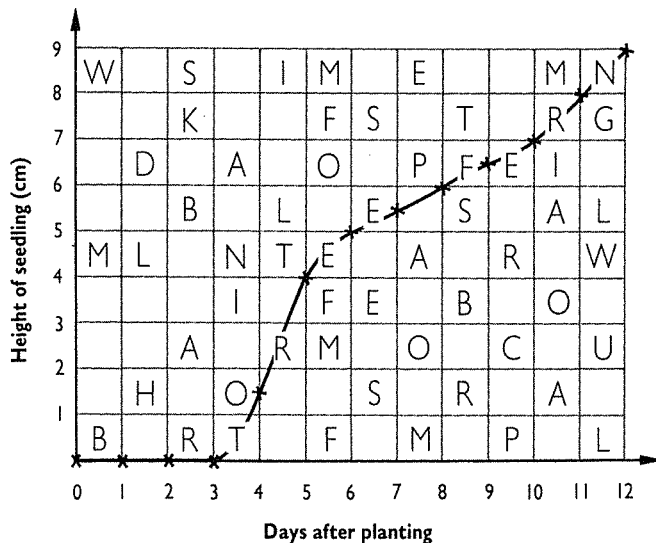
BLM 30: 'The Earth around us' bingo

See instructions for conducting a bingo game in 'Hints for using Blackline masters'.

BLM 31: Plant assimilation: Which clover has the largest number of leaves?

Answer: The number of leaves is *fourteen*!

BLM 32: What is the world's largest fern?



Answer: Tree fern

1. After day 3.
2. Between days 4 and 5.

BLM 33: Food webs

1 and 2. See the first food web diagram below.

3. (a) If the grass died, then the rabbits and mice would die (assuming the grass was their only source of food). If the rabbits and mice died, then the hawks would die too.
(b) If a disease killed all the hawks, the rabbits and mice would increase in numbers and the grass might become scarce.

4. See the second food web diagram below.

BLM 34: Research sheet: I feel sick! Digestive disorders and diseases

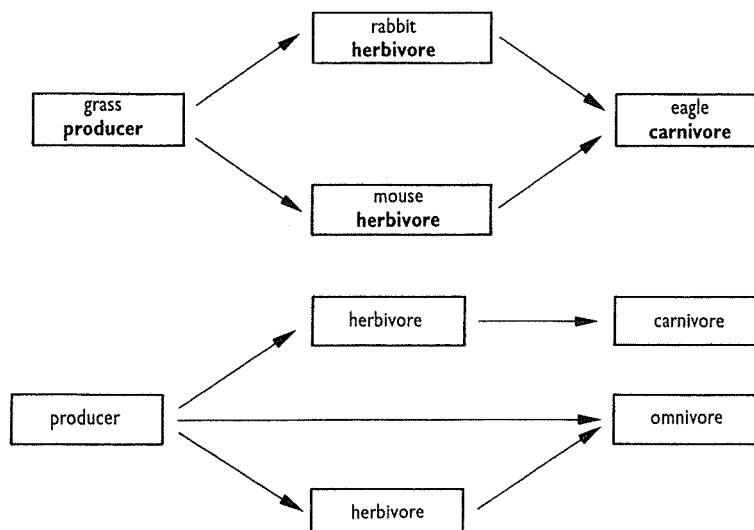
Since this is a student research project, no answers are provided.

BLM 35: Diagrams of the digestive and respiratory systems

These two diagrams are provided for labelling exercises.

BLM 36: Comprehension: Blood, the Red Cross, and you

2. Blood cells and plasma.
3. *Red blood cells* pick up oxygen from the lungs and carry it around the body. *White blood cells* help to protect the body. *Platelets* help to clot blood. *Plasma* is the straw-coloured liquid in which the blood cells are suspended.
4. 16 years old.
5. It does not take a week to replace lost blood. The volume of blood is back to normal within a few hours.
6. Centrifuging.
7. *Red blood cells* are used in transfusions. *Platelets* are used to control bleeding.



BLM 37: Matter

1.

Substance	Is it a solid, liquid or gas?	Is it an element, compound or mixture?
air	gas	mixture
water	liquid	compound
lemonade	liquid	mixture
crude oil	liquid	mixture
table salt	solid	compound
blood	liquid	mixture
sugar	solid	compound
steam	gas with small droplets of liquid	compound
gold	solid	element
silver	solid	element
diamond	solid	element
carbon dioxide	gas	compound
soil	solid	mixture
magnesium hydroxide	solid	compound
sulfur	solid	element

2. (a) shape
(b) volume, shape.
(c) volume, shape, fill.
3. (a) Element—a substance made up of only one type of atom; a substance that cannot be broken down into simpler substances by chemical means.
(b) Compound—a substance made up of more than one type of atom, joined together chemically in fixed proportions.
(c) Mixture—a combination of two or more elements and/or compounds physically combined together in no specific proportions.

BLM 38: Crossword: Materials



Word list

gas, yes, Fe, ago, tin, particle, naturally, iron, element, compound, mixture, magnet, immiscible, leave, not, all, oil, eve, materials, atoms, synthetic, separate, enter, note, Al, coal, As, time.

Additional word list

heat, filtrate, magnetise, filter, paper, At, air, soil, mix, evaporate, list, made, use.

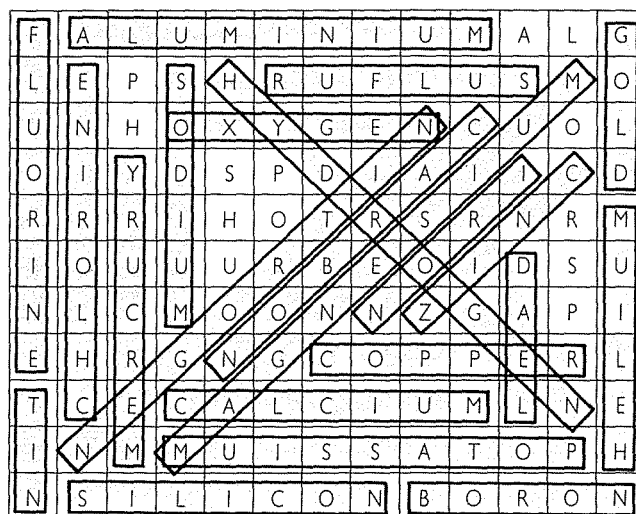
BLM 39: What is in our food?

Number of additive	Name of food additive
Bonzo Jelly Crystals	
■ 297	fumaric acid
■ 331	sodium citrates
■ 123	amaranth
■ 133	brilliant blue FCF
Gloupy Packet Soup	
■ 150	caramel

2. Additive 621 is monosodium glutamate.

BLM 40: 'Elementary'

1. H hydrogen Al aluminium
He helium Si silicon
B boron S sulfur
C carbon Cl chlorine
N nitrogen K potassium
O oxygen Ca calcium
F fluorine Cu copper
Na sodium Zn zinc
Mg magnesium Au gold
Fe iron Sn tin
2. Sodium, magnesium, aluminium, potassium, calcium, copper, zinc, gold.
3. hydrogen, helium, nitrogen, oxygen, fluorine.
- 4.



BLM 41: Periodic table of the elements

4. Helium, neon, argon, krypton, xenon, radon.

BLM 42: Separating mixtures

Answer: chromatography.

BLM 43: Ground water in Australia

1. About 80 per cent.
2. Magnesium and calcium salts.
3. Stops soap from frothing; has a strange metallic taste.
4. (a) Manganese salts cause a black colour.
(b) Iron salts cause red or yellow colour.
5. Colour and taste.

Research

Water could be purified by:

1. distillation (e.g. a desert still);
2. addition of chemicals (tablets to remove either microscopic bugs or the metals).

BLM 44: 'Chemical' bingo cards

See instructions for conducting a bingo game in 'Hints for using Blackline masters'.

BLM 45: A harder puzzle: What is the fastest moving marine mammal?

Answer: Killer whale

See the completed histogram below.

BLM 46: The cost of smoking

1. \$64 000
2. \$128 000
3. (a) Sickness for the smokers.
(b) Early retirement.
(c) Damage caused by fire.

BLM 47: Diagrams of the circulatory system and the skeleton

These two diagrams are provided for labelling exercises.

BLM 48: A research sheet: Danger signs

Corrosive: capable of eating away and destroying living tissue.

Example: sulfuric acid

Flammable: capable of catching fire easily.

Example: ethanol

Harmful: capable of causing undesirable effects on health if the substance is swallowed, inhaled or absorbed through the skin.

Example: mercury

Explosive: tending to break up violently; may be caused by a flame, friction or by dropping.

Example: dinitrobenzene

Toxic: poisonous, causing serious illness or possibly death.

Example: litharge (lead oxide)

Oxidizing: in this instance, 'oxidizing' means capable of reacting violently with other materials to produce a lot of heat and possibly fire.

Example: most nitrates

Radioactive: having the property where nuclei of atoms break up and give off harmful rays that may cause illness.

Example: radioactive sources

Harmful: stow away from foodstuffs; capable of causing poisoning if kept near foodstuffs.

Example: lead nitrate

